NATIONAL TRANSPORTATION SAFETY BOARD

IN RE:	
THE EL FARO INCIDENT OFF THE COAST OF THE BAHAMAS ON OCTOBER 1, 2015	NTSB Accident No. DCA16MM001

Interview of: THOMAS GRUBER

Friday,
January 29, 2016

ABS
Washington, D.C.

BEFORE:

ERIC STOLZENBERG, NTSB
MICHAEL KUCHARSKI, NTSB
JEFF STETTLER, USCG

This transcript was produced from audio provided by the National Transportation Safety Board.

APPEARANCES:

On Behalf of TOTE Services:

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On Behalf of ABS:

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P-R-O-C-E-E-D-I-N-G-S

(9:25 a.m.)

INVESTIGATOR STOLZENBERG: Okay. Good morning. My name's Eric Stolzenberg. I am Senior Accident Investigator with the National Transportation Safety Board. I'm here for the sinking of the El Faro. I am the Group Lead for the Naval Art Group.

Today is January 29th, it is about 9:25 a.m. We're at ABS Washington Office. We're here today to interview Mr. Tom Gruber. And, Mr. Gruber, could you spell your name, for the record?

RESPONDENT: Thomas, T-H-O-M-A-S, Gruber, G-R-U-B-E-R.

INVESTIGATOR STOLZENBERG: Thank you. Also present, here at ABS Headquarters, and I'll start on my left.

MR. O'MEARA: Dennis O'Meara, D-E-N-N-I-S, O-'-M-E-A-R-A, with TOTE Services.

MR. WHITE: Jerry White, W-H-I-T-E, outside counsel with Hill Rivkins, representing American Bureau of Shipping.

MR. STETTLER: Jeffrey Stettler, J-E-F-F-R-E-Y, Stettler, S-T-E-T-T-L-E-R. I'm a civilian with the U.S. Coast Guard.

INVESTIGATOR STOLZENBERG: And on the

conference call?

MR. WHITE: Yeah, we're --

MR. GARZA: Erik Garza, Associate General Counsel, with ABS. I'm here in Houston.

INVESTIGATOR KUCHARSKI: Mike Kucharski, Group Chairman, NTSB, for the Nautical Operations.

INVESTIGATOR STOLZENBERG: Okay, thank you. And I understand, later, we may have Mr. Lou O'Donnell joining us from ABS. Now, the NTSB is an independent federal agency charged with determining the probable cause of transportation accidents promoting transportation safety. We are not part of the DOT, or the United States Coast Guard. We have no regulatory, or enforcement, powers.

The purpose of this investigation is to increase safety, not to assign fault, blame, or liability. However, the NTSB cannot offer any guarantee of confidentiality or immunity from legal or licensed actions.

We'd like to record the interview to ensure an accurate record. Mr. Gruber, I just want to ask, if you have an objection to this?

RESPONDENT: No, go right ahead.

INVESTIGATOR STOLZENBERG: Okay, thank you. A transcript or summary of the interview will go into

the public docket. You will be given an opportunity to review the transcript and suggest corrections for accuracy, prior to its release.

The interviewee, in this case, Mr. Gruber, can have one representative of the interviewee's choice. We do know we have another representative in Houston who's just listening in, is not directly representing today.

The representative may not testify for the interviewee and the representative's comments should be limited to, and objections are not grounds for the NTSB to refrain from asking questions.

Mr. Gruber, please, answer all questions to the best of your recollection. If you don't know the answer, please state so. Don't, you don't have to search for an answer.

If you don't understand a question, please ask to have it repeated. And if you realize you misstated something or would like to clarify a previous answer, please do so it's okay and we would prefer that.

Okay, so I'll get started. Mr. Gruber, what is your current job title, your employer, and your employer?

RESPONDENT: I work for the American Bureau

of Shipping. I am in the Chief Engineer's Office. My job title is Assistant Chief Engineer Statutes.

INVESTIGATOR STOLZENBERG: Okay. Could you give us a brief description of your background in the Marine industry, your training, up to this position you have now?

RESPONDENT: I graduated SUNY Maritime College in 1988 with a Bachelor of Engineering in Naval Architecture. Went to work for ABS from there. From 1988 to about 1990 I worked in Load Line Stability Group. Spent six months in the Small Vessels Structures Group, then went back to the Load Line Stability Group.

1993 I took over the Load Line, running the Load Line Stability Group. Did that through 2009. In 2009, I transferred to the Naval Engineering Department, doing load line and stability and worked there till the end of 2013, where I transferred into the Corporate Chief Engineer's Office.

INVESTIGATOR STOLZENBERG: From 2013 on, have you been doing the load line stability work, or is that a different type of work you're doing now, since '13?

RESPONDENT: Occasionally, when needed, I can supplement, do the high volume, workload volumes,

with Load Line Stability Group. Other than that, I do work with the United States Coast Guard on their delegation to the International Maritime Organization for the development of load line and stability-related regulations.

INVESTIGATOR STOLZENBERG: Okay, thank you. So if I could ask this, what products does ABS typically provide to commercial ships, with regard to stability and load line?

RESPONDENT: We would issue, run the calculations, do the verification, and issue a load line certificate to a vessel. We would also, as part of that load line requirement, there are stability requirements that have to be met and we would do the review of the light ship and stability and stability operating manual for the vessel to be put onboard for the master. It would also look at stability computers.

INVESTIGATOR STOLZENBERG: Stability computers, as well, okay. Let me drill down a little bit, if, let's start with a load line. How was a typical load line process completed? In other words, what's the process for, for being contacted, analysis, review, and approval, for a load line?

RESPONDENT: When the owner requests ABS Services, they will request the load line, in addition

to the classing, or the plan review. The request would go down to the Load Line Stability Department, they would take the drawings, do the load line calculations to develop the maximum load line, based on the International Load Line Convention.

A surveyor would also survey the vessel, once the vessel's complete and report back on the condition of the vessel. Those things, the conditions of assignment would be reviewed, along with the stability, when everything was in proper order, an assignment would be sent to the surveyor to implement and issue the certificate onboard the vessel.

INVESTIGATOR STOLZENBERG: So is stability analysis required to get a load line?

RESPONDENT: Yes, Regulation 10 Requires a stability review and stability information be put onboard the vessel.

INVESTIGATOR STOLZENBERG: And those stability reviews would be approved by ABS?

RESPONDENT: We issue the load line on behalf of the Flag Administration, so if the Flag Administration permits us to review the stability, or authorizes us to do that, we will do that, on their behalf.

INVESTIGATOR STOLZENBERG: Okay. With

regard to load line, in general, what safety, or margin of safety is a load line certificate intended to provide to the vessel?

RESPONDENT: The load line certificate sets the maximum draft for the vessel, which ensures there's a certain amount of reserved buoyancy above the load line. It also looks at the condition of assignment, the door seals, the hatchet, coamings, air pipes, ventilators, any opening above the freeboard deck, to make sure that it meets a certain height, as delineated in the regulations, and is provided with a closure device. So --

INVESTIGATOR STOLZENBERG: And a freeboard deck, what's the typical definition for a freeboard deck?

RESPONDENT: Typically, it's the upper most complete weather tight deck.

INVESTIGATOR STOLZENBERG: Okay. I'll go around the table here, regarding load line assignment questions, in general.

MR. STETTLER: Jeff Stettler, Coast Guard. Is there a relationship, without getting into details, between damage, potential damage of the vessel, you mentioned reserved buoyancy, so the stability analysis that is part of the load line review process that you

mentioned, is there any damage assessment that goes into that?

RESPONDENT: The load line is assigned under either a Type A vessel, which is a vessel designed to carry liquid cargos in bulk, so your tankers. And then, a Type B vessel is anything else.

A Type A vessel has to meet a damage criteria that's in Regulation 27 (inaudible), in addition to any other statutory requirements, like MARPOL, or IBC Code, IGC Code, and SOLAS.

A Type B vessel, typically, gets a lesser freeboard, because the, the deck is not water-tight, it's not as structurally, it's not as strong as a typical tanker deck. You can get a reduction in that freeboard, if the vessel meets the same Regulation 27 Damage Stability Requirement.

MR. STETTLER: Okay, just to clarify that, is a damage analysis done of any type associated with the assignment of a load line?

RESPONDENT: The only time a damage analysis is done is if it's Type A ship, or a B-reduced --

MR. STETTLER: B-reduced.

RESPONDENT: -- B-60, or B-100 freeboard.

MR. STETTLER: Okay. Was the El Faro either of those?

RESPONDENT: No.

MR. STETTLER: Thank you.

INVESTIGATOR STOLZENBERG: Okay. This is Eric Stolzenberg. I have in my notes from some review that the process to obtain a load line is one, weather-tight and water-tight integrity of the vessel; tow, buoyancy at the forward end; three, a stability review; four, strength and scantling review; and five, freeboard.

And then, the assigned load line is based on the lesser of one, the stability draft; two, the scantling draft; or three, the geometric freeboard from the freeboard tables, is that, generally, correct, the way I've just stated?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: Thank you. Additionally, for load lines, how are openings in the hull treated? And when I say that, I say it was, specifically, with regard to the El Faro, we had vents and we had openings above the freeboard deck to put ramps on, you know, we had a covered, a covered deck, so how are the vents and openings considered, in general, for load line rules?

RESPONDENT: Okay the, the hull up to the freeboard deck, which, on the El Faro was the 02 Deck,

or the 2 Deck, has to be water-tight up to that deck. Anything above that has to be weather-tight, has to have weather-tight closures.

Now, the 2 Deck on the El Faro was an open deck for RORO spaces, so it was not considered, the side shell was not considered tight, so it was not considered a super structure, or buoyant volume, so everything on there would have to meet Position 1 requirements for coaming heights and closing appliances.

INVESTIGATOR STOLZENBERG: And what are those typical Position 1 requirements, in general?

RESPONDENT: They're, basically, donated in the Convention, door seals that lead below the deck have to be 23-and-a-half inches, ventilators 35-and-a-half inches above the deck, air pipes 30 inches above the deck, hatches 24 inches above the deck. And there are some relaxations for specific, certain specific arrangements.

INVESTIGATOR STOLZENBERG: And when you say the Convention, you mean Load Line Conventions in SOLAS?

RESPONDENT: The Load Line Convention is not part of SOLAS, it's a separate convention, so it's the International Convention on Load Lines 1966, as amended

by the 1988 Protocol and the 2003 Amendments.

INVESTIGATOR STOLZENBERG: Okay.

RESPONDENT: In 1993 the 2003 Amendments would not have been applicable to the El Faro, obviously, based on the time frame.

INVESTIGATOR STOLZENBERG: And let me, before we get specific to the El Faro, let me ask the folks on the, Mike, on the conference call, do you have any questions along load lines, in general, stability, in general?

INVESTIGATOR KUCHARSKI: The only one, and this may be more specific, I don't know if Jeff is going to handle this, but as far as hogging sag the application to load lines, do you want to hold that, or can I ask it now?

INVESTIGATOR STOLZENBERG: Let's go ahead with it now.

INVESTIGATOR KUCHARSKI: Okay. Thanks, Mr. Gruber, just a quick question, is there any treatment of Hogged or sacked in the allowances, or in the load line, itself?

RESPONDENT: No.

INVESTIGATOR KUCHARSKI: Okay. Thank you.

INVESTIGATOR STOLZENBERG: Okay. I'll go around the table.

MR. STETTLER: I don't have any additional questions, nothing specifically.

INVESTIGATOR STOLZENBERG: All right. In general, what is a downflooding point on a vessel and is it part of a load line, is it in the Load Line Convention, or is it related to a subset of Load Line Convention, like the stability assessment?

RESPONDENT: The, there is no definition of downflooding point in the Load Line Convention. That is the downflooding point is a part of the stability analysis, which is required by the Load Line Convention, but it's, typically, done to other requirements, in the case of the Coast Guard, 46 CFR sub-chapter S, the stability requirements for foreign flagged vessels, the Intact Stability Code, and various other stability instruments that IMO puts out.

INVESTIGATOR STOLZENBERG: Okay. With regard, specifically, to the El Faro, do you know the downflooding point, as described?

RESPONDENT: The downflooding points used in the damage stability requirements, I believe, were the exhaust vent trunks on the, on 2 Deck.

INVESTIGATOR STOLZENBERG: And the documentation we can find that in would then be in the Damage Stability Review?

RESPONDENT: In the Stability files that were uploaded and requested and uploaded into Accellion.

INVESTIGATOR STOLZENBERG: Okay. Thank you. To take a step back, for a moment, and we can get back more to damage stability at a, we'll go around on that topic at a later time. This is Eric Stolzenberg. What major products did ABS provide over the life of the El Faro, regarding stability?

RESPONDENT: We were not involved in the stability until the conversion in 1992/1993.

INVESTIGATOR STOLZENBERG: All right

RESPONDENT: Prior to that, the United States Coast Guard Third District approved the stability.

INVESTIGATOR STOLZENBERG: Okay.

RESPONDENT: So at that point, we were involved with the major conversion, as deemed by the Coast Guard in 1993, which was the lengthening of the vessel. We recalculated the load line for that change, we performed the stability review, witnessed the inclining experiment in the field, reviewed the inclining results and approved the stability documentation that went onboard for the master.

INVESTIGATOR STOLZENBERG: In '93.

RESPONDENT: In '93.

INVESTIGATOR STOLZENBERG: And then, would that have been reviewed over the years?

RESPONDENT: Once a booklet is reviewed, it is, typically, not changed, unless owner wants it to be changed, unless there's some kind of change to the vessel.

INVESTIGATOR STOLZENBERG: Is that, when a surveyor goes out, either annually, bi-annually, and excuse my ignorance, I don't know the frequency they would go out, do they check parts of the stability --

RESPONDENT: They --

INVESTIGATOR STOLZENBERG: -- onboard?

RESPONDENT: For the Load Line Convention, they go out on an annual survey, to make sure there have been no changes to the vessel that effect the load line and they would verify that the stability information is onboard the vessel.

INVESTIGATOR STOLZENBERG: Okay. And so was that done up until the next conversion, which is about 2005 where, to our understanding, that's when the vessel gets containers above the weather deck?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: And then what would have happened in 2005?

RESPONDENT: For the conversion there, from the load line and stability portion of it, there was, we looked at the stability, they had to do another inclining experiment, so we approved the procedure for the inclining, we looked at and improved the results of the inclining and reviewed the updated stability booklet, issued a load line assignment.

And then, there were some updates to TNS booklet over the next, over the next month there was a revision to the booklet, I think, over the next year there was another revision where they updated the tank sounding tables in the booklet, and then we looked at the stability program that they put onboard, stability instrument, and approved that.

INVESTIGATOR STOLZENBERG: Was that stability instrument put on in, in 2005, to your recollection?

RESPONDENT: I believe, it was 2008.

INVESTIGATOR STOLZENBERG: 2008, okay. And regarding earlier, I read off from some research that the assigned load line was based on lessor of the stability draft, the scantling draft, or the geometric freeboard for the freeboard tables.

RESPONDENT: Correct.

INVESTIGATOR STOLZENBERG: In the case of

the El Faro, which one of the assigned load line was based on which of those three?

RESPONDENT: The --

INVESTIGATOR STOLZENBERG: To your knowledge?

RESPONDENT: It's very close to the assigned, the minimum required Type B freeboard. There may be a small difference, which would, it would base upon the owner's request. And when I say owner, I mean, we were dealing with a Naval Architect, on behalf of the owner, so when I say owner, it's coming from that side of the table.

INVESTIGATOR STOLZENBERG: And so in this case, we understand it to be Herbert Engineering Corporation in '05/'06?

RESPONDENT: Correct.

INVESTIGATOR STOLZENBERG: And so when you say it was Type B, is that mean the assigned load line was based on the geometric freeboard from the freeboard tables?

RESPONDENT: As corrected by the, in the Convention, yes.

INVESTIGATOR STOLZENBERG: Okay. So it wasn't limited by the stability draft, or the scantling draft?

RESPONDENT: No.

INVESTIGATOR STOLZENBERG: Thank you. I'll go around with any questions on draft again, or load line. Mr. Stettler.

MR. STETTLER: And I, Jeff Stettler, Coast Guard, I believe, what you just answered will answer this question, but I just wanted to ask it in a slightly different way. Are there any supporting structural analyses required for a load line certificate?

RESPONDENT: Yes.

MR. STETTLER: Okay.

RESPONDENT: Yes. A, before a vessel can receive a load line, it has to meet the requirements set forth in the Convention, which typically point to the class requirements.

MR. STETTLER: Okay.

RESPONDENT: So there was a scantling review done.

MR. STETTLER: Does ABS perform, or independently verify that calculation, as part of their review, as part --

RESPONDENT: Which calculation, the --

MR. STETTLER: -- of their review?

RESPONDENT: -- the structural?

MR. STETTLER: The structural calculation, yes.

RESPONDENT: Yes.

MR. STETTLER: Okay. Thank you. Was this done on the El Faro, following the 2004/2006 conversion?

RESPONDENT: Following that conversion, we in the Load Line Group, found that the scantlings were approved for the sister vessels for a draft deeper than that was being requested for the El Faro, so we took that as confirmation that the scantlings were acceptable, based on the sister vessel.

MR. STETTLER: Did you know what, what document states that, or what, I haven't seen it, so I'm asking if you happen to know what document approved, approved that for the sister vessel and which sister vessel?

RESPONDENT: It was the El Maro and El Yunque. And the letter's actually in the stability, the load line file that was, that's been provided. I don't know if I have a copy of it here. It was ABS Letter, dated 5 March 1990. It was the sister vessel, the El Maro.

MR. STETTLER: 1990 was El Maro. And that's a letter about the El Maro, approving the El Maro, or

referencing the El Maro?

RESPONDENT: No that was the letter on the, on the El Maro.

MR. STETTLER: Okay so that would provide what was done on the El Maro?

RESPONDENT: Right.

MR. STETTLER: And then, where was it, where was it stated that, that the approval for the El Faro was based on the El Maro?

RESPONDENT: We didn't, we didn't issue a letter on that.

MR. STETTLER: Perfect.

RESPONDENT: We used the reference from the sister vessel to confirm the scantling check.

MR. STETTLER: Okay, so that does not show up as a reference on the load line certificate, is that correct?

RESPONDENT: No.

MR. STETTLER: Okay. Thank you.

RESPONDENT: The only reference on the load line certificate would be a reference to the approved stability documentation.

MR. STETTLER: Okay. Thank you.

INVESTIGATOR STOLZENBERG: Eric Stolzenberg, NTSB. Tom, we mentioned that it comes from the

freeboard tables, and again, I apologize for not understanding fully, what do the geometric freeboard from the freeboard tables, what is, what is that coming from, why is that applied versus a scantling draft, or a stability draft?

RESPONDENT: The Load Line Convention was written and implemented in 1966. It includes a set of tables that are based upon the vessel's length. Based on a load line length, there's an associated basic minimum freeboard and then they're, then it's adjusted, based upon the different corrections in the Convention, block coefficient, different super structure arrangements, and then that, eventually, comes up with the minimum freeboard that can be assigned to the vessel.

INVESTIGATOR STOLZENBERG: Just in your experience, do you have any knowledge of how those tables were developed in 1966, or what were the input values that were used to come up with those tables?

RESPONDENT: No. Long before my time.

INVESTIGATOR STOLZENBERG: Okay. Just, just curious, thank you.

MR. STETTLER: (Inaudible) related. Jeff Stettler, Coast Guard. Is there, in those tables, or in the, your use of those tables, is there any

connection, at all, with a metacentric height, or a height of the center of gravity, does that show up anywhere in that?

RESPONDENT: No.

MR. STETTLER: Okay. Thank you.

INVESTIGATOR STOLZENBERG: Okay, on the phone, any, Mike, any questions along these line?

INVESTIGATOR KUCHARSKI: No, I'm set.

INVESTIGATOR STOLZENBERG: All right. I'm going to move on, specifically, to the El Faro. To your knowledge, what was the stability criterion the El Faro had to meet when it sailed on it's, on it's last voyage, for intact and damaged?

RESPONDENT: Intact stability was the wind heel criteria in 46 CFR, Part 170.170, and then, the SOLAS probabilistic damage stability in Chapter 2-1, Part B-1, of SOLAS.

INVESTIGATOR KUCHARSKI: Mike Kucharski?

INVESTIGATOR STOLZENBERG: This is Eric Stolzenberg. I just, for a technical check, Mike, we just did hear you there.

INVESTIGATOR KUCHARSKI: Oh, sorry. I dropped out. I keep hitting the end, instead of mute, sorry.

INVESTIGATOR STOLZENBERG: No problem, we'll

continue.

INVESTIGATOR KUCHARSKI: Anal cerebral inversion here.

INVESTIGATOR STOLZENBERG: Thank you. To your knowledge, did the intact, or damage, criterion change over the life of the vessel, or when it was modified for spar deck or the containers, so in '93 and 2005?

RESPONDENT: Well the wind heel accounts for the wind profile of the vessel, so that would have changed when they added the container, they took the spar deck off and added the containers in 2005, and the SOLAS probabilistic damage is based, is run at the assigned load line draft and a light draft, so that would have changed when the, when the draft changed.

INVESTIGATOR STOLZENBERG: Okay. Along the same, same lines, I've heard there's different levels, Levels 1, 2 and 3 of damage stability in SOLAS, any of those levels apply to the El Faro?

RESPONDENT: I'm not familiar with --

INVESTIGATOR STOLZENBERG: Level --

RESPONDENT: -- the different levels you're talking about.

INVESTIGATOR STOLZENBERG: Okay. I was under the understanding that, with probabilistic

stability that things could be assessed at different levels, but not, not in this case.

RESPONDENT: No.

INVESTIGATOR STOLZENBERG: That might be a future. Meyer (phonetic), I apologize. That's, that's why I just want to understand it. So was damage stability required to be reassessed in 2004 to 2006, with the addition of the, the containers?

RESPONDENT: Not due to the addition of the containers, but due to the increase in draft, at that point.

INVESTIGATOR STOLZENBERG: And so how much did the draft increase, to your knowledge, in the conversion from '04 to '06?

RESPONDENT: Approximately two feet deeper.

INVESTIGATOR STOLZENBERG: And so two feet greater draft would have required a damage stability assessment?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: And what, what's the practical reason that that's required for, is it, I understand that it may be in the rules, so let's, I mean, it's a two-part question, is it in the rules that it be done and then, two, what's the practical reason that it's reassessed?

RESPONDENT: Well the, the SOLAS probabilistic damage is run at two different drafts, at a light draft and at the maximum draft. When you increase the draft, the maximum draft, you're changing the parameters of the regulation, so that would require it to be redone.

INVESTIGATOR STOLZENBERG: Okay, so the change in maximum drafts would be the, the tipping point for reassessment of damage stability. And the practical reason then, is, I don't want to put words in your mouth, it's just, the practical reason is that, it's just at a deeper draft, or --

RESPONDENT: Well when the calculations are run, the differences would show up in the required GM curve that would be put into the trim and stability booklet.

INVESTIGATOR STOLZENBERG: Okay. Understood. Was intact stability required to be reassessed in 2006's?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: And was that done?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: Okay. And was the damage stability reassessed in 2006?

RESPONDENT: I believe it was.

INVESTIGATOR STOLZENBERG: And who, who did the damage stability reassessment in 2006?

RESPONDENT: Mahmood Billah was the review engineer for ABS.

INVESTIGATOR STOLZENBERG: And he's the review engineer. Would he have reviewed a firm's work, in this case, I might believe it to be Herbert Engineering?

RESPONDENT: He would review the submitted calculations.

INVESTIGATOR STOLZENBERG: Submitted calculations. Okay. And I'll pass that to Dennis O'Meara, along this topic line.

MR. O'MEARA: No I don't have any questions.

MR. STETTLER: I just, I guess, Jeff Stettler, I'm a little confused. You said he would have, or he actually did review a damage stability calculation, or submit a damage stability calculation?

RESPONDENT: I've been, we've been searching for the calculations in our files, unfortunately, they're not complete and so I can't --

MR. STETTLER: Who, who would have submitted that damage stability analysis?

RESPONDENT: The Naval architect, you know,

or the owner --

MR. STETTLER: Okay.

RESPONDENT: -- of the shipyard, could've been.

MR. STETTLER: So at the time of that 2005/2006 conversion that would have been Herbert Engineering?

RESPONDENT: Most likely.

MR. STETTLER: Okay. But you have not been able to find anything submitted, were you able to find anything that, anything was reviewed by, internally, by ABS, during that time?

RESPONDENT: No, unfortunately, our files were sent out to be scanned and they came back incomplete, so I cannot find the details of that review.

MR. STETTLER: I recall the 2000, or the, excuse me, the 1993, and it may be '94 or '93, the Trim and Stability Book Approval Letter referenced both, an intact stability analysis and a damage stability analysis in that reference, so ABS had reviewed both of those, as part of that approval.

But I noticed that the review, or the approval letters from 2005, 2006, 2007 did not reference a damage stability analysis, so is that part

of what you're basing that off of, is there's no record of that having been done anywhere, or referenced, or is there, you just haven't been able to find it? Have you find a reference?

RESPONDENT: I have not found any of the details in our files.

MR. STETTLER: (Inaudible) references --

RESPONDENT: Right.

MR. STETTLER: -- having been -- okay. Thank you.

INVESTIGATOR STOLZENBERG: This Eric Stolzenberg, along the same lines, do we have contact information, or a spelling, for Mr. Mahmood Billah?

RESPONDENT: M-A-H-M-O-O-D, B-I-L-L-A-H.

INVESTIGATOR STOLZENBERG: Okay. And is he still, presently, to your knowledge, is he presently employed with ABS?

RESPONDENT: No, he's retired.

INVESTIGATOR STOLZENBERG: Okay. Mike Kucharski, any questions?

INVESTIGATOR KUCHARSKI: No, I think you're going to get into specificity in the Trim and Stability Book, yes?

INVESTIGATOR STOLZENBERG: Yes.

INVESTIGATOR KUCHARSKI: Okay, I'll hold,

then. Thank you.

MR. STETTLER: I do have another question on, Jeff Stettler, Coast Guard, again, it's a related question, while we're talking about damage stability, understanding that it was not done, at least, you found no reference of it having been done, does ABS normally, independently, verify damage stability calculations that are submitted, and I believe the answer was yes?

RESPONDENT: Yes.

MR. STETTLER: Okay. How do they do this for probabilistic damages, is there a work instruction, an internal work instruction, at ABS that guides the engineer, the reviewing engineer, to do that?

RESPONDENT: We use the GHS Program, so -- I mean, specifically, step-by-step, no there's not a --

MR. STETTLER: So I, which was my next question, do you use a software program to do that, and you just stated that you use GHS, General Hydro Statics, --

RESPONDENT: Yes.

MR. STETTLER: And my understanding is they have a, excuse me, a, and I don't know what the right term for it is, it's a standard set of routines that --

RESPONDENT: Wizard.

MR. STETTLER: Wizard, thank you. That's

what the term they use that performs those calculations. Thank you. And just to confirm that that's what ABS uses when they do these calculations, typically?

RESPONDENT: Currently, yes. At that point, I don't believe the wizards were available.

MR. STETTLER: Okay.

RESPONDENT: We're talking over ten years ago.

MR. STETTLER: Right.

RESPONDENT: And then for the original one they were definitely not available in 1993.

MR. STETTLER: Okay. So do you have any idea how that would have been done in, well 1993 is a long time ago, but let's suppose one was done in 2006, how would that have been reviewed in 2006?

RESPONDENT: We would have created a rung file to run the damage calculations in accordance with the Convention.

MR. STETTLER: Okay, so you would go through the entire probabilistic scenario --

RESPONDENT: Yes.

MR. STETTLER: -- with the probability matrix you use and all of that stuff that, it gets done.

RESPONDENT: That's all in the program, itself. What the wizards have done is, basically, compiled all the rung files that users would typically --

MR. STETTLER: Okay.

RESPONDENT: -- do and put it all in one place.

MR. STETTLER: Are you aware, specifically, dealing with the wizard, perhaps, but even before the time period of the wizard, was that ever validated that, you know, using the ABS, or, excuse me, the GHS wizard, for example, has there been any validation done of that, of that calculation, either through Creative Systems, the company that distributes GHS, or internally at, at ABS, has there been any validation of that?

MR. WHITE: On this, Mr. White, validation, are you referring validation of the computer program?

MR. STETTLER: Of the Code, correct, so that the calculation is, indeed, correct that the program is producing.

RESPONDENT: Prior to being released to the engineering staff to use a program is validated and checked by our IMS Department, or Technology Department, so that's done before we even get to use

the program.

MR. STETTLER: Okay, do they actually verify the, the actual calculations, the numerical answers?

RESPONDENT: I'm not part of what they do, --

MR. STETTLER: Okay.

RESPONDENT: -- so --

MR. STETTLER: Okay. So they don't have test cases of, and that sort of thing, okay.

RESPONDENT: I don't know.

MR. STETTLER: Okay.

RESPONDENT: I do know that the, as far as 1993, the calculations were verified by the Coast Guard, as well, so -- and, and they did not come back with any, during their oversight, they did a complete recheck of the calculations and didn't have any issues with it.

MR. STETTLER: Okay. Thank you.

INVESTIGATOR STOLZENBERG: Eric Stolzenberg, NTSB. Earlier we, we talked about the increase in the draft, necessitated in a new damage stability assessment and intact assessment, what modifications to a vessel require a new dead weight survey, intact, or damage stability assessment? And I understand the draft increase, but are there other, other

modifications to a vessel that will require that?

RESPONDENT: You, can you clarify that, because you talked about dead weight survey and stability?

INVESTIGATOR STOLZENBERG: Well let me, let me start with --

RESPONDENT: They are two different questions.

INVESTIGATOR STOLZENBERG: Let me start with dead weight survey. What modifications to a vessel would require a new dead weight survey?

RESPONDENT: The Coast Guard has documentation in Marine Technical in '04/'95, which delineate the requirements for accepting a detailed weight moment calculation, which is up to two percent change in lightship, an aggregate change in lightship, between two and ten percent would require a dead weight survey and over ten percent would require an inclining experiment. So they've put that out there and that's the industry standard for the United States.

INVESTIGATOR STOLZENBERG: So if we go, specifically, to the El Faro, in 2004 or 2006, who would've determined that the vessel needed a dead weight survey, or an intact and damage stability assessment? Let's start with dead weight survey.

RESPONDENT: Normally, for a review, the detail weight calculation is submitted showing the different changes. Based on the amount of, I don't think there was, I don't recall a discussion, at that point, of even considering a dead weight survey, because of all the changes that were being made, removal of the spar deck, its, I guess, to a certain internal modifications, as well as the addition of the permanent ballast, it was agreed to do a inclining experiment right from the start. So I don't recall any discussion of doing less than inclining experiment.

INVESTIGATOR STOLZENBERG: So the Naval architects, who were proposing the changes, it was, essentially, accepted that this was a big enough change of the vessel that everybody knew it was going to require inclining experiment --

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: -- which would include a dead weight survey, as part of it?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: I'll let Jeff continue on this line of thinking.

MR. STETTLER: Inclining experiments, since we're on the topic. So I'd like to ask you a few questions, basically, regarding the process at ABS for,

process for the inclining experiment and for ABS' participation in that process. Who actually schedules and manages the inclining experiment, say, at the shipyard, at a shipyard?

RESPONDENT: The person responsible for the inclining experiment could be the shipyard, it could be the Naval architect, it could be somebody designated by the owner. ABS does not conduct the inclining experiment.

MR. STETTLER: Does ABS participate in the inclining?

RESPONDENT: We witness. We have a surveyor go onboard and witness the test to, to make sure that it's performed in accordance with the approved procedure.

MR. STETTLER: Okay. I noticed in several of the, well, one of the large documents that was provided last week, from ABS, one of the large stability documents, there was a large number of pages dedicated to the ABS Surveyor notes from the inclining experiment, which, and I don't recall the date, but it was 2005, I think, in that time frame.

Or, it looked like almost as though the ABS surveyor was keeping a very detailed log of specific tanks and drafts of freeboard measurements, et cetera,

is that typical of an inclining experiment for the, ABS?

And the reason I ask is, because the submitted inclining experiment report, which came from the Naval Architecture firm, didn't have any of that detail in it. So it almost seemed, as though the ABS surveyor was the source of the data for the inclining, as opposed to just observing it.

RESPONDENT: ABS' internal procedure requires the surveyor to fill out a data verification --

MR. STETTLER: -- if you could verify what was done, internally, --

RESPONDENT: Yes.

MR. STETTLER: -- because it was a different group. The surveyor did, did observe, witnessed --

RESPONDENT: Right.

MR. STETTLER: -- and the Load Line Stability Group, I believe, --

RESPONDENT: Yes.

MR. STETTLER: -- did (inaudible) --

RESPONDENT: All the engineering work is done back --

MR. STETTLER: Is done, right.

RESPONDENT: -- in the, at the Engineering

Department. Yes, we would have then, using the freeboards and a draft locations, verified the as inclined condition of the vessel, through GHS, we would have calculated the lightship, the as inclined VCG, based upon the pendulum measurements, and then taken the waste to add, waste deduct, waste to relocate, we would have then recalculated the final lightship values --

MR. STETTLER: Okay.

RESPONDENT: -- and compared them to submit a report.

MR. STETTLER: Okay. And I've got one more fairly detailed questions, but I think it's an important one that, and without getting into the details of the whole process and what calculations get done, but one of the products of this that is used to calculate the GM, value is a graph, or plot that plots the tangent of the angle and, I think it's the weight time, I'd have to look at my notes, but --

RESPONDENT: Moment tangent plot.

MR. STETTLER: Yes, moment tangent plot. And I noticed in this case, and I assume, in the case of the
El Faro, and again, this is recollecting from the surveyor notes, but there's a fair amount of scatter in

the measurements at each, so several data point are taken at each angle and there's a fair amount of scatter in that, could you comment on which data points are used?

Is there any kind of uncertainty analysis done to determine, because there's one line that's fit between, through those points, could you comment on whether or not there's any kind of uncertainty analysis that gets done, as part of that process, or is there an attempt to use the, what is observed to be the worst case points in fitting a line, or setting a line on that plot that has the largest slope --

RESPONDENT: The --

MR. STETTLER: -- to give you the worst case result?

RESPONDENT: The plot that's shown is, typically, the plot that's done by the Naval architect, during the test, to ensure that there's a straight line plot obtained, during inclining experiment.

We would take the values and provide if one was, obviously, not, I mean, you can tell when there's a point that's, that's just wrong, you know, either being restrained by the batten, or something that we have to throw out, otherwise, the, basically, you run the point through the middle, you know, the average of

the three points to get that point on the curve, on the plot.

MR. STETTLER: Okay. So there is, and I don't know that we need to reference this, specifically, bring it in, but, so there is, just to summarize, there is some scatter in the observed.

And there is also quite a bit of scatter in the actual measurements of the freeboards, the drafts, in the condition of the vessel, so is there any, as part of that procedure, either calculate GM, or from (lightship) KG, from, in the lightship, is there any kind of uncertainty assessment that's done, other than, by the, by the person doing the analysis, trying to, trying to fit a best, visually, fit a best, or through those points?

MR. WHITE: Just, this is Mr. White, when you say uncertainty assessment, is that any, is that a term --

MR. STETTLER: Yes they're --

MR. WHITE: -- of (inaudible), or --

MR. STETTLER: In engineering, yes.

RESPONDENT: Okay.

MR. STETTLER: Experimental uncertainty, basically, there's an analysis --

MR. WHITE: Okay.

MR. STETTLER: -- process for doing that. And that's, basically, what I'm asking, is part of the, either the ABS review process, or the submitting Naval Art, Naval architecture firm required, or do they, do any of them routinely do an uncertainty analysis to provide the result that the lightship KG, is, with the uncertainty level, you know, the, is, you know, the confidence interval, for example, is that, is any of that done, during any of these inclining experiments for these vessels?

RESPONDENT: If the Naval architect does that, it's typically not submitted as part of the report.

MR. STETTLER: Okay. So you, do you ever see that with submittals for inclining experiments?

RESPONDENT: I, I don't recall.

MR. STETTLER: You don't recall.

RESPONDENT: I've seen hundreds, thousands of these over --

MR. STETTLER: Okay.

RESPONDENT: -- my career.

MR. STETTLER: Okay. So it certainly doesn't jump out, as something that's, that's done routinely?

RESPONDENT: No. We have disallowed points.

We had, have disallowed --

MR. STETTLER: Okay.

RESPONDENT: -- draft mark readings when --

MR. STETTLER: Okay, just --

RESPONDENT: -- they're, obviously, incorrect.

(Crosstalk)

MR. STETTLER: Okay, based on mutual agreement between the submitting Naval architecture firm and ABS, or what, what's the criteria for, for --

RESPONDENT: There are --

MR. STETTLER: -- (inaudible)?

RESPONDENT: There are times a Naval architect will dispense with points and they'll put a note in the report that says, for this reason we've done that, other times and if it comes to us, we'll run our numbers and delete the suspect points.

MR. STETTLER: Okay. Okay. No further questions, thank you.

INVESTIGATOR STOLZENBERG: This is Eric Stolzenberg. Just to reference a previous document of the inclining experiment, it's PDFABS1062_incline only.

MR. STETTLER: No that's, I'm sorry. That's, that was, I, it's out of the -- just 1062.

INVESTIGATOR STOLZENBERG: 1062.

MR. STETTLER: I just, I just trimmed it out of the other one, yes.

INVESTIGATOR STOLZENBERG: Okay. Thank you. And it's the --

MR. STETTLER: Because it's 600 pages.

INVESTIGATOR STOLZENBERG: -- the drawing number is called Inclining Experiment Record Sheet from Herbert Engineering.

MR. STETTLER: Correct.

INVESTIGATOR STOLZENBERG: All right. Any other questions on the incline, Mike Kucharski, on the phone?

INVESTIGATOR KUCHARSKI: No.

MR. O'MEARA: Tom, this is Dennis, --

INVESTIGATOR KUCHARSKI: No questions, thank you.

MR. O'MEARA: This is Dennis. Can you, can you comment, at all, on what, what, when a vessel meets the stability limits, as prescribed in the various conventions, what does that tell me about the expectation for the vessel, does that tell me that the vessel is expected to be stable and still water with no wind, does it tell me the vessel can deal with 45 knots of wind on the beam with an eight-foot sea, what, how do I translate the stability limits, as prescribed,

into, if at all, anticipated environmental conditions that the vessel might endure?

RESPONDENT: I believe, the Coast Guard weather criteria is based upon an approximate wind speed of 50 to 55 knots and it's, it's a beam wind applied to the worst case wind profile area, so it takes account the ship, the stack, the superstructure, any deck cargo, or anything on board the deck, anything on the deck, so it just assumes that. And in this specific criteria, the vessel cannot heel more than 14 degrees, or half the freeboard, whichever is less. So that's, that's the only intact criteria that the vessel had, that it is required to meet.

INVESTIGATOR STOLZENBERG: This is Eric Stolzenberg. When you say the vessel, do you mean, a typical vessel, or the El Faro?

RESPONDENT: The El Faro. That, there are other intact stability criteria, based upon different vessel's uses, or vessel length.

INVESTIGATOR STOLZENBERG: So the criteria, as applied to the El Faro, resulted in the 14 degrees, or half the beam.

RESPONDENT: Half the freeboard.

INVESTIGATOR STOLZENBERG: Half the freeboard, excuse me.

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: Thank you.

(Off microphone discussion)

INVESTIGATOR STOLZENBERG: I want to go, go back to a question I had earlier, I may not have phrased it correctly. Is, who determines a major modification, in this case, I'll say, specifically, to the El Faro?

In other words, in 1993, to my understanding, the vessel was not in the ACP Program, the Alternate Compliance Program, so in 1993, who's the authority that tells the owner and the submitting Naval architect, that they have done a major modification and the assessments were dead weight survey, or intact stability, damage stability, these things need to apply?

MR. WHITE: Is your question, what if -- this is Mr. White. Is your question, what authority designates it, as quote unquote a major modification?

INVESTIGATOR STOLZENBERG: That's correct.

MR. WHITE: Okay.

RESPONDENT: The United States Coast Guard is the one that makes that determination, so the submittal is made to them on what the proposed modification is and they would reply, whether or not it

was considered to be a major or a minor modification.

INVESTIGATOR STOLZENBERG: And who would send the letter to the United States Coast Guard, would it be ABS, on behalf of the owner and the Naval architect, would it be the owner, would it be the Naval architect?

RESPONDENT: It would be the owner, or the owner's representation.

INVESTIGATOR STOLZENBERG: Okay. And does that also supply, excuse me, apply to a vessel, like the El Faro, once it had entered the Alternate Compliance Program?

RESPONDENT: I would have, I don't know the answer to that, I would have to check. It would not be done, that would not be done by the Load Line Stability Department that would be done higher up.

INVESTIGATOR STOLZENBERG: Okay. Thank you.

MR. STETTLER: Nothing on that topic.

INVESTIGATOR STOLZENBERG: Mike, anything on that topic, on the phone?

INVESTIGATOR KUCHARSKI: No. Thank you.

INVESTIGATOR STOLZENBERG: Okay. What's the difference between deterministic and probabilistic damage stability? We understand the El Faro, in '93, was run with probabilistic stability, you know, just

for, in laymen's terms, what's the difference, to your understanding, between those two types of stability?

RESPONDENT: A deterministic damage stability criteria is a criteria that sets certain damage extents and certain -- that have to be applied to the ship, and certain survival criteria.

And then, for every draft and every possible case of damage, up to and including the maximum damage extents, the vessel would have to survive that extent of damage and by survival, you meet the criteria that's set forth in the Convention. So every, every condition of damage would have to meet the criteria.

Probabilistic is the area of damage to the ship, you know, longitudinal extent at the transverse extent and the vertical extend is based upon historical data where a probability of damage in that case, based on prehistorical data has been determined.

And there is a survival criteria. And for each damage case you meet, you get a certain credit towards your Attained Subdivision Index. For every damage case that fails to meet the criteria, and by failing you could, if you don't meet the criteria, the vessel could still be afloat or it could sink.

You get no credit towards that criteria to that attained index. And for every damage case, you

keep adding on to that criteria, to the attained index, until you meet the required index.

INVESTIGATOR STOLZENBERG: Okay.

RESPONDENT: So the deterministic means you would meet all the criteria for all damage cases. Probabilistic means you have enough cases that survive to meet the criteria.

INVESTIGATOR STOLZENBERG: Understood. Is one considered, generally, more conservative than the other, in your opinion?

RESPONDENT: In my opinion, I think the damage, the deterministic criteria is a better criteria.

INVESTIGATOR STOLZENBERG: Would that translate to more, a more conservative criteria? When you, I guess, what's the definition of better?

RESPONDENT: In my opinion, having been out to sea when I, you know, at Maritime, I graduated with a Third Assistant Engineer's license, the important thing is for the Master and the crew to know that within a certain set of extensive damage that the vessel will meet and survive, meet a criteria and survive. With the probabilistic damage, there's no guaranty that the vessel's going to survive.

MR. STETTLER: Could, just, if I could ask,

Jeff Stettler, Coast Guard, just to clarify, so for example, you mentioned they could fail, as part of that process, you could have a, meet a satisfactory index, but you could fail certain damage conditions that, you know, might be, so just a -- but those that the probability of those damage conditions are based on historic data, right, you said, basically, historic data?

RESPONDENT: Yes.

MR. STETTLER: So for example, a Titanic, you know, which had rigging damage of three compartments, you know, that would -- there's a fairly low probability of that occurring, so a vessel might fail that particular damage scenario, but because of the probability of that, or, historically, and a probability, and the number of occurrences of that have been so low, the vessel may still pass damage stability, even though, it would have failed --

RESPONDENT: Yes.

MR. STETTLER: -- that condition. Thank you.

RESPONDENT: But it's not limited to that. I mean, it could fail one compartment damage --

MR. STETTLER: Right.

RESPONDENT: -- and still pass the criteria.

MR. STETTLER: Right.

RESPONDENT: So you asked if I preferred one or the other, yes, I prefer that deterministic. However, probabilistic is better than having no criteria.

INVESTIGATOR STOLZENBERG: Understood.

MR. O'MEARA: And, Tom, this is Dennis. What, what determines whether a vessel's damage stability is based on the probabilistic, or the deterministic?

RESPONDENT: The SOLAS probabilistic damage applies to any dry cargo ship over 80 meters in length. Originally, it was 100 meters in length, in 1992, when it was enacted, since then the limit dropped down to 80 meters.

Now, if a vessel meets another damage stability instrument under IMO, such as MARPOL, the gas carrier code, bulk chemical code, the OSV criteria, which are all deterministic criteria, then the vessel's exempt from meeting the probabilistic damage.

MR. O'MEARA: Okay. So, so say that again, if the, if the vessel meets one of those other protocols, then it's exempt from having to meet the probabilistic, is that --

RESPONDENT: If the vessel's required to

meet --

MR. O'MEARA: If it's required to meet?

RESPONDENT: To meet, yes. You cannot meet another damage, a deterministic criteria, in lieu of the other one, by choice, you have to be required to meet that criteria.

MR. O'MEARA: Okay, and so for El Faro, was El Faro required to meet the probabilistic or the deterministic?

RESPONDENT: Because there was no other damage requirement applicable to the vessel, it could not be exempted from the probabilistic damage in SOLAS.

MR. O'MEARA: So it was required to meet the probabilistic?

RESPONDENT: Yes.

MR. O'MEARA: And, even though, getting back to your, your personal viewpoint that the deterministic was a better criteria, there's no, there would be mechanism for anyone to say, I, the deterministic is a better criteria, let's strive to meet that criteria? The vessel was obligated to meet probabilistic and because it, it was not required to meet any others, it was required to meet the probabilistic, with no alternatives?

RESPONDENT: From a statutory standpoint

that is correct.

MR. O'MEARA: Okay.

INVESTIGATOR STOLZENBERG: Eric Stolzenberg, NTSB. I'd just like to follow-up, because I've heard some similar lines of thinking, regarding the Master not understanding all the cases for probabilistic damage stability, at some IMO meetings. Could you explain your earlier statement, regarding the Master not understanding the damage he has, relative to the probabilistic assessment?

RESPONDENT: Umm --

INVESTIGATOR STOLZENBERG: Or ask me to rephrase. Why is the Master unable, less able, to understand, to deal with his onboard real-time damage under the probabilistic rules?

MR. WHITE: This is Mr. White. You express your opinion, correct?

INVESTIGATOR STOLZENBERG: Correct.

MR. WHITE: That the Master may have difficulty understanding the significance of the probabilistic criteria?

INVESTIGATOR STOLZENBERG: That's correct.

MR. WHITE: Could you explain why, why you feel that way?

INVESTIGATOR STOLZENBERG: Thank you.

RESPONDENT: Okay, the probabilistic damage, there's, there could be hundreds of different damage cases at each draft that have to be checked. Some will, most will pass, some will not pass.

Getting the Master to understand what damage he has onboard the vessel and then, go through those hundreds of cases to figure out, was this covered, did it meet the criteria, did it not meet the criteria, and if it did not meet the criteria, did it sink, or did it still remain floating, is where the difficulty would have happened for the Master.

In addition to doing everything else that the Master is required to do in (inaudible) this situation, paging through hundreds and hundreds of pages of damage stability calculations, probably not the answer that he wants to hear, he or she wants to hear.

INVESTIGATOR STOLZENBERG: So the information would be aboard the vessel, but it's, it's difficult to access it in a timely fashion, due to the sheer, sheer volume?

RESPONDENT: There are damage control plans in SOLAS that could be placed on the vessel at the behest of the Coast Guard, they're not required to be approved, it's up to the OCMI to require them to be

onboard.

INVESTIGATOR STOLZENBERG: But, at this time that is not a requirement?

RESPONDENT: It is, right, it's, it's, they're not, they're require -- they're to be onboard, at the request of the administration, but they do not have to be approved.

INVESTIGATOR STOLZENBERG: Okay.

MR. O'MEARA: This is Dennis, could you explain what those damage control plans are and how that would make the Master's decisiontry (phonetic) simpler, given the conditions you just described?

RESPONDENT: A damage control plan, typically, shows the vessel and shows all the different closure devices, water-tight boundaries, closures to doors, anything that would limit the flooding of the vessel, piping, valves in the piping to prevent progressive flooding, all that information.

In addition to the probabilistic, they have what's called damage consequence diagrams, which are supposed to present, to the Master, the results of the probabilistic damage calculations.

They, to-date, have been very difficult to develop, simply because of the sheer volume of damage cases that there's no rapid and simple means for the

Master to get that information.

I know those damage consequence diagrams were discussed at IMO, after the implementation of the probabilistic damage requirements.

INVESTIGATOR STOLZENBERG: This is Eric Stolzenberg. In the case of El Faro, is it, from your knowledge of the probabilistic damage stability, is it, could the vessel, potentially, have sunk with, say, only one compartment flooded?

RESPONDENT: I would have to go through the calculations. I don't want to make a, a guess, at this point.

INVESTIGATOR STOLZENBERG: Understood. Mike, on the phone?

INVESTIGATOR KUCHARSKI: Yes, sure. Mr. Gruber, do I understand the damage control plans and the damage control manual, they're still not required for vessels, is that correct?

RESPONDENT: The SOLAS --

INVESTIGATOR KUCHARSKI: Or they are to be approved?

RESPONDENT: SOLAS says they have to be onboard the vessel. However, there is no indication in SOLAS that they have to be approved. So at that point, it would fall under the OCMI to require the vessel, to

go onboard and request that the plan be put onboard.

INVESTIGATOR KUCHARSKI: I see, so it's up to the administration. So in this case, it'll be Coast Guard then.

RESPONDENT: Correct.

INVESTIGATOR KUCHARSKI: Does that hold, just out of curiosity, does that hold to passenger vessels, too, are we just talking about cargo?

RESPONDENT: Damage control plans are required for cargo ships. Sorry, they're required for passenger ships.

INVESTIGATOR KUCHARSKI: Oh okay. Okay. And these, you can say, about having so many different scenarios, or being cumbersome to the Master, to go ahead and thumb through all these pages and look at all this information in a, well, life or death scenario, let me put it that way. What about in using the loading instrument, can, flooding situations, can that not be done?

RESPONDENT: The stability instrument was not reviewed for that possibility. The stability instrument was reviewed for compliance with the applicable regulations. There are programs that some vessels have onboard where they can evaluate the stability, based upon that, I don't know if this

program had that capability, if it does, it was not part of our review.

INVESTIGATOR KUCHARSKI: Right. Right. I guess, we were just talking about damage control plans, generally, and information feeding in and you mentioned about the, you know, instructions for Masters, you know, thumbing through a lot of pages, so you have seen in certain programs that, decision support, for lack of a better word, in a, in a situation where you were facing loss of ship?

RESPONDENT: I am aware that some programs have them, I have not looked at them.

INVESTIGATOR KUCHARSKI: Okay. Thank you. No further.

MR. STETTLER: Can we talk about trim and stability, a little bit, or what's your (inaudible) --

INVESTIGATOR STOLZENBERG: Okay, this is Eric Stolzenberg, NTSB. Yes, Jeff, why don't you lead off with another topic?

MR. STETTLER: It's, I have a question that relates to damage stability analysis, but to get to that, I think, just in general, I'd like to ask a couple of questions about trim and stability book, specifically, the review by, an approval by ABS in 2004 or 2006 time frame, I guess, 2007 was the actual, the

blast read the approval, February, I believe, it was.

So we talked recently about what was normally submitted to ABS, along with the trim and stability book, and we mentioned that, normally, an intact analysis is provided, as well as a damage analysis, and those, normally, those would be referenced in the approval of the trim and stability book that, but the damage stability analysis was not specifically referenced, which is why there's no record, or no known, nothing referencing that that has been done.

And we also confirmed, Tom, I believe, you confirmed that ABS does, normally, independently, verify the calculations that are submitted with the trim and stability book, or you do your own calculations to confirm --

RESPONDENT: Okay.

MR. STETTLER: -- is that correct?

RESPONDENT: Just to go back to your first question, the approval letter for the trim and stability booklet did not reference damage stability calculation that's correct. That's not to say that we didn't issue a separate letter on the damage stability.

MR. STETTLER: Okay.

RESPONDENT: So like I said, I don't know, I

have not been able to find that --

MR. STETTLER: Okay.

RESPONDENT: -- sorry.

MR. STETTLER: All right.

RESPONDENT: Just to clarify.

MR. STETTLER: Okay, thank you.

RESPONDENT: And as far as the independent check, yes. When we, we (inaudible) do an independent check on everything, we don't just look to make sure that the Naval architect has met the criteria, we, we do an independent check.

MR. STETTLER: Okay. So in 2004 or in 2006, in that time frame, I believe, I saw in your stability file, the file provided last week that, you used general hydrostatics for that review --

RESPONDENT: Yes.

MR. STETTLER: -- several times, as there were different, different things submitted over the several-year period. So I understand general hydrostatics was used. And so you say you performed an independent analysis.

I'd like to ask, specifically, about the required GM curves, and one of the primary, I think, things that comes out of that trim and stability book is the set, or presented to the vessel, anyway, is the

set of required GM curves, for each stack height on the containers, because each stack height creates a different wind profile, so therefore, creates a different set of curves.

And in there, the only, the only criteria that was used to create those GM, curves was the Coast Guard weather criteria, and this is according to Herbert Engineering, which was used -- Herbert Engineering also mentioned to us yesterday that the weather criteria was the limiting criteria, rather than a damage condition, or damage criteria.

I'm trying to figure out how to, how to ask this correctly. If the damage stability analysis was not completed, or there's no record of it, how was it known that the intact criteria was the limiting criteria?

RESPONDENT: Okay. That, well that assumes that the damage stability calcs weren't done.

MR. STETTLER: Right.

RESPONDENT: What we, when we develop a minimum GM curve, or a max KG curve, we look at all the applicable criteria and then the, if there's one criteria that's above the rest, then the KG curve and the trim and stability booklet reflects that value. We don't put the rest of them in there.

MR. STETTLER: Okay.

RESPONDENT: If it's a composite curve, then we put the composite curve --

MR. STETTLER: Okay.

RESPONDENT: -- in there. So if the weather criteria was the controlling criteria then, as appears in this case, then that would be the only curves that are put into the booklet.

MR. STETTLER: Okay.

RESPONDENT: And that was the case in 1993.

MR. STETTLER: All right.

RESPONDENT: So.

MR. STETTLER: So just to, so just to confirm, to your recollection and your review, your recent review of the documentation over that time frame, you did not see any evidence that the, that the damage stability criteria was, was limiting, in any way, or --

RESPONDENT: Correct.

MR. STETTLER: -- a statement of such in the (inaudible)?

RESPONDENT: I have not found anything in our files.

MR. STETTLER: Okay. Thank you. I'm done.

INVESTIGATOR STOLZENBERG: Mike, any

questions on the T&S booklet?

INVESTIGATOR KUCHARSKI: Yes. Mr. Gruber, the trim and stability booklet was reviewed somewhere around 2007, by ABS, correct?

RESPONDENT: Yes. The last one was approved May 31st, 2007.

INVESTIGATOR KUCHARSKI: Okay, great, great. On Page 6 of the booklet, well it starts at Page 6, and it talks about routine operating instructions. And, you know, it states for a roll on/roll off vessel, I'm just, I'm just trying to get a simplistic point of view of a, you know, of a user of the manual, who sort of know that the, you know, we put stacking, we put stacking bars on there, bars, frames, to load containers and everything and the vessel had somehow, is it changed it, still RORO vessel, or was it clear to consider it a container vessel and is it normal to leave the instructions, like, for a RORO and not capture any instructions, based on the stacking containers?

RESPONDENT: As far as the stability goes, they're considered cargo and there are, the blank loading forms include the spots for each of the pieces of cargo. The stability booklet is not a cargo securing manual.

It's not a loading manual, it's purely a stability document, so there's no reason to treat them any different, being containers or RORO cargo, as long as they're accounted for in the calculation and the vessel meets the required GM curve, the statutory requirements have been met.

INVESTIGATOR KUCHARSKI: Okay, so even though the effects of wind may be a little bit extenuated, I mean, I'm looking at the instructions here. This is, this is like what I've seen in 1970 when I first looked at this, you know, keep your tanks pressed up, or empty, and the (inaudible) pumped.

There's nothing else in here that specifically addresses what you can do to enhance stability when, or reduce, maybe, adverse effects, since it was changed, you know, by putting containers on it?

MR. WHITE: This is Mr. White. Do you understand the question?

RESPONDENT: Give me, could you please give me an example of what you mean in that regard?

INVESTIGATOR KUCHARSKI: Yes I, well, you know, for instance, you have all the wind heel criteria in there, there's no mention of anything about, you know, the 55 knots, or that jumps out and hits me, you

know, where I've seen it in other ones that I've reviewed, trim and stability books, especially, for passenger vessels where, you know, you see it jump out there and say 90 knots, or 55 knots, or it was based on that.

So, you know, let, you know, going back to almost mixing it together when you say, you know, the Master's thumbing through all this, just have something at the top of his head to say, okay, 55 knots that's what this is based on.

So minimize that, you know, when you talk about pumping (inaudible), you know, changing the profile, maybe, instead of heading into a, or taking a beating wind, taking it, maybe, head on, or something like that. Is that ever thought about, simple instructions like that, when you have a change, you know, from the RORO to the container-type ship?

RESPONDENT: No, I mean, we've, I've reviewed numerous container ships and not seen that type of guidance put into a trim and stability booklet before.

INVESTIGATOR KUCHARSKI: Okay. Okay. So you've never seen that in the past, like you say, for container ships, okay. Thank you.

INVESTIGATOR STOLZENBERG: Okay, this is

Eric Stolzenberg.

MR. STETTLER: I have nothing more on trim and stability.

INVESTIGATOR STOLZENBERG: Okay.

MR. STETTLER: Okay.

INVESTIGATOR STOLZENBERG: I just wanted to go back to the term weather criteria limited. We understood the El Faro was intact weather criteria limited, what does this mean?

RESPONDENT: It means that the required GM, based upon the weather criteria, was greater than the required GM, based on any other applicable criteria.

INVESTIGATOR STOLZENBERG: Okay. Is it, and what are some of the other applicable criteria that could have driven the GM?

RESPONDENT: In this case, it would have been the probabilistic damage stability.

INVESTIGATOR STOLZENBERG: Okay, so in this case, the intact criteria is the guiding, or is the highest level -- I got to phrase this properly.

RESPONDENT: Critical. It's the critical curve.

INVESTIGATOR STOLZENBERG: The critical curve comes from the intact stability, not from the probabilistic damage stability curve?

RESPONDENT: Correct.

INVESTIGATOR STOLZENBERG: Okay. Is it typical for cargo vessels of this sort, to have the intact curve be the driving, the critical curve versus the damage stability curve?

RESPONDENT: It's vessel to vessel. There's no -- because the criteria and, especially, the probabilistic is determined based on the arrangement of that vessel, you can't really compare different vessels on that.

INVESTIGATOR STOLZENBERG: Okay, thank you. If no one has any questions, regarding the intact criteria, I'll move on to another topic.

MR. O'MEARA: I guess, just for my own understanding, how is it, can you describe how it's possible that the, that the intact curve is more critical than the, well lack of a better term, than one that assumes damage, how is that -- I'm trying to, I'm just trying to look at the -- intuitive thinking, how is it that the, that a curve that describes the intact stability is more restrictive than a curve that talks to damage?

RESPONDENT: They're, really, it's based upon each individual vessel, there's no, there's no standard guidance about what to expect, you know, we

don't, I, when we do a review we don't go in with preconceived notions about what, what's going to be critical.

We run each individual criteria and then, then come up with the worst case. So it just happens in this case, if there were other criteria applicable, maybe, they would have been critical, but there's no way to tell, without running the numbers.

MR. O'MEARA: Okay, I guess.

INVESTIGATOR STOLZENBERG: This is Eric Stolzenberg, to follow-up. And I understand we're in some opinion area here. But to go along Dennis' lines of thinking, doesn't that indicate this vessel is more susceptible in some way to wind, since it's the wind heel and the intact stability that requires the most GM versus other vessels, or --

RESPONDENT: That's typical of vessels that carry a lot of deck cargo, you know, be it a container ship, any kind of general cargo ship that carries cargo on a deck, or an OSV that carries a lot of large deck cargo on the AFT deck. They're all more susceptible to the wind criteria.

INVESTIGATOR STOLZENBERG: Okay, thank you. That helps me. We'll move on to another subject --

RESPONDENT: Do you mind just taking a quick

--

INVESTIGATOR STOLZENBERG: -- before we do it --

RESPONDENT: -- ten-minute break?

INVESTIGATOR STOLZENBERG: Just what I was going to suggest. We'll go off the record for a ten-minute break.

(Whereupon, the foregoing matter went off the record at (time not given) and went back on the record at 10:53 a.m.)

INVESTIGATOR STOLZENBERG: This is Eric Stolzenberg. We're at ABS Headquarters, at 10:53 a.m. and we're continuing on back on the record, with Mr. Tom Gruber.

RESPONDENT: Eric, if I could, go back to a question that Mike had asked before? Mike, you had asked about the addition of additional guidance for the Master in the T&S booklet, for different things.

You have to understand that ABS is not developing the trim and stability booklet that's developed by the Naval architect, assumed to be with input from the owners, at that point.

Our review is for the statutory review and requirements, as set forth by the Coast, in this case, by the Coast Guard. Is there additional information

that might help? Sure. I mean, you can take that to the empt degree, but we can only make them put in the T&S booklet what's required by the Regulations. So we can't require them to go above and beyond the regulations. If that makes a little more sense?

INVESTIGATOR KUCHARSKI: Yes, Tom, and I hope I didn't insinuate that you were, just that --

RESPONDENT: No.

INVESTIGATOR KUCHARSKI: -- (inaudible) --

RESPONDENT: I just wanted to make sure I had a better --

INVESTIGATOR KUCHARSKI: -- (inaudible).

RESPONDENT: -- a better answer for you.

INVESTIGATOR KUCHARSKI: No that's fine. That's fine. And I, and we can just, we can look at the statutory requirements and not only for the administration, but then, under SOLAS, too, or maybe the stability Codes, but, you know, I'm just sort of incredulous, that's all. But thanks for the clarification, much appreciated.

INVESTIGATOR STOLZENBERG: Okay. This is Eric Stolzenberg. I'll move on to a topic here with, is the cargo max --

RESPONDENT: One more thing?

INVESTIGATOR STOLZENBERG: Okay, go ahead,

Tom.

RESPONDENT: Lou O'Donnell is in the other office now.

(Off microphone discussion)

MR. O'MEARA: Good morning, Lou.

MR. O'DONNELL: Good morning.

(Off microphone discussion)

INVESTIGATOR STOLZENBERG: Let me do some housekeeping then. Good morning, Lou. We'll note that you are here, for the record, if you could spell your name and give us your position and you position within the investigation, please?

MR. O'DONNELL: Yes, Louis O'Donnell, Assistant Chief Surveyors of Americas, I'm part of the engineering part of the investigation and my first name is spelled L-O-U-I-S, last name, O-'-D-O-N-N-E-L-L.

INVESTIGATOR STOLZENBERG: Thank you, Lou. And when we go around, we've been using topic areas, and we go around for questions, please feel free, as a party of the NTSB investigation, to ask questions yourself.

MR. O'DONNELL: Okay, thank you.

INVESTIGATOR STOLZENBERG: Okay, I'll start on then, with what is the Cargo Max Program, I think, also referred to as a stability instrument in a

technical term. As I understand it, both the T&S booklet is aboard the vessel, in this case, the El Faro, and the Cargo Max is aboard the vessel. Tom, are both Cargo Max and the T&S booklet approved by ABS?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: And the Cargo Max Program, the stability instrument, is it correct to call it a stability instrument?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: What is a stability instrument approved for?

RESPONDENT: A stability instrument, there's different types of stability instruments, Type 1, Type 2, and Type 3 stability instrument that do different things. A Type 1 would check intact stability only.

A Type 2 would check intact and damage stability, based upon limiting curves, and a Type 3 would, actually, check intact stability and then damage stability, based upon an in-depth calculation of all the possible cases of damages that are pre-loaded into the system.

INVESTIGATOR STOLZENBERG: In the case of El Faro, do we know the level of the instrument installed?

RESPONDENT: This, although the letter says a Type 3, it's actually a Type 2 program.

INVESTIGATOR STOLZENBERG: A Type 2 program. And to review, again, the Type 2 program does what?

RESPONDENT: It calculates the intact and damage stability requirements, based upon limiting GM curves.

INVESTIGATOR STOLZENBERG: So it -- all right. Another question I have is, in the ABS stability letter, dated 8 February 2008, signed by yourself, I'll quote a part of it where it says, approved stability software is not a substitute for the approved stability information and is used as a supplement to the approved stability information referencing the trim and stability booklet. My question is, why is this stated in the approval letter and what is the practical implication of this statement?

RESPONDENT: In all stability instruments, a printed onboard stability booklet is required to be onboard. Okay? These programs simplify the process, shorten the time frame, to get the Master results, and generally are easier to use, to those that are computer literate.

And the wording in there is to prevent somebody from submitting that in lieu of a hard copy stability booklet. The backup, the original approval

is the primary approval. The computer, the program is a supplement to it, but it cannot replace it.

INVESTIGATOR STOLZENBERG: Is part of that due to the history that the trim and stability booklet was the first instrument approved and required on vessel and the software stability instruments have come up in latter years?

RESPONDENT: The stability booklet contains a lot of information that the program has built into it, but is not readily available. You know, to search tanks, you don't have to look at the tank tables, the stability booklet has them and are in printed form in front of you, where you're actually loading at the tanks, based upon, in a program, either by inputting the weight, or the sounding. So that's one example.

Having the hydrostatics available. And should something happen to the program that the program gets corrupted, or the computer is rendered inoperable, you have a fallback of the original stability booklet to use.

INVESTIGATOR STOLZENBERG: Okay. Follow-up on that, how is the Cargo Max and the stability instrument tested and re-certified? In other words, how do we know, as different revisions of this come out that they're still valid? How do we know week-in

week-out that the program's functioning, as intended?

RESPONDENT: Okay. Go back to the wording, it's, actually, it comes out of an IX unified interpretation, unified requirement for stability booklets, IX URL-5 and also, the intact, the IMO Intact Stability Code.

INVESTIGATOR STOLZENBERG: And when you say the wording, you mean the statement I quoted out of the stability letter, earlier?

RESPONDENT: Yes. And so they're, actually, documented in other instruments.

INVESTIGATOR STOLZENBERG: Thank you.

RESPONDENT: The program, itself, is approved by the Engineering Office, along with a certain set of approved loading conditions, check conditions that are provided to the vessel. When the vessel installs the program for the first time, an ABS surveyor has to go onboard, witness the installation and then run, have somebody from the crew run the check conditions on the computer and compare them to the approved check conditions and they have to be the same. Okay?

INVESTIGATOR STOLZENBERG: Okay.

RESPONDENT: The other, and that's done on an annual basis, at the annual load line inspection.

MR. O'MEARA: This is Dennis. The approved check conditions, then, are derived from the trim and stability book, itself, against which the software is being compared, during this check?

RESPONDENT: Well the approved, the approved conditions can be from the program, itself. You know, they're the ones that are submitted when the program is reviewed and are stamped at that date. And then, they're used, as a check, to make sure nothing's changed in the program when it's, when it spits out, when it spits results out when they're checked.

MR. O'MEARA: Okay. So -- all right. Thank you.

MR. STETTLER: Jeff Stettler, from the Coast Guard. To follow along with that, just to, perhaps, to clarify, is there any process, as part of that approval, review and approval process, to compare the output of the loading instrument computer with the observed vessel conditions, such as drafts and list?

RESPONDENT: No.

MR. STETTLER: Okay. Okay. Could you, I'd like to, basically, address, or ask about the ABS review and approval process for loading computers, or stability instruments, does ABS have a work instruction for review and approval for that process that the

engineer goes through to review that?

RESPONDENT: Yes we have a process instructions specifically for review of stability software.

MR. STETTLER: Okay. Just as you have one for trim and stability books? Well --

RESPONDENT: We have one for stability test procedures, stability test results, intact stability, damage stability, crane stability and stability computers.

MR. STETTLER: Do those procedures simply provide, basically, a checklist, or a step-by-step number of items for the engineer to check, or do they actually give him work instructions on how to perform his task in detail?

RESPONDENT: It's both.

MR. STETTLER: So -- and I believe you've answered this question, but just to confirm, does ABS perform an independent validation of the accuracy of that, of the onboard loading computers, or the stability instruments?

RESPONDENT: Yes, we -- it depends. If it's reviewing to a specific approved curve, it would be the same curve, GM curve, KG curve that's in the stability booklet. So we would check to make sure under, for

each draft that the appropriate curve is being looked at.

In this case, they do have an additional capability of evaluating the actual wind profile for the condition they're checking, you know, depending on the actual stack heights. And that was checked, you know, we would run conditions on the program and then verify it by hand, to make sure that they're accurate.

MR. STETTLER: Other than GM, what other baseline, or criteria do you use to compare the stability of the onboard loading instrument? I understand that stability is, you know, GM, but drafts and lists also play into that, in terms of the accuracy of the, of the program, is there any other assessment made?

MR. WHITE: This is Mr. White. Just to be clear, is your question geared for the approval of the program, initially, or the attendance of the surveyor when he runs --

MR. STETTLER: The --

MR. WHITE: -- checks?

MR. STETTLER: The approval of that instrument for that vessel. So is there any, you mentioned, you don't compare the actual, you don't do a draft measurement, basically, like an inclining, but do

you, do you compare to any other references, other than the trim and stability book, for example?

RESPONDENT: No.

MR. STETTLER: Okay. The stability instrument loading computers are based on some type of hydrostatic model, geometric model of the ship, of the vessel, does ABS review that model, at all, or are they simply reviewing the outputs of that, in other words, do you review the, the stability model that's used as the basis for the calculation, or do you just review the results of that calculation in the program?

RESPONDENT: It depends on the extent of the program. If it's just verifying against the KG-allowable curve, we make, or GM-required curve, then we're making sure that it meets the, meets that curve and the hydrostatics are the same as the trim and stability booklet. If we're doing additional calculations over and above that, then we'll do an independent calculation, typically, we use a GHS program.

MR. STETTLER: Okay.

RESPONDENT: We try, we avoid using the same model to avoid, if there's problems with the model, we don't want to recreate the same errors.

MR. STETTLER: Right. And thank you, and

that was actually going to be my follow-up question was, very often, you know, Cargo Max, for example, which is a loading computer, or the stability instrument on the El Faro is based upon a geometric model, which may have also been used to generate the trim and stability book.

And so as part of the review, and you've already answered this, for the trim and stability book you do an independent assessment and you create your own analysis model, using GHS, primarily, I believe, you said?

RESPONDENT: Yes.

MR. STETTLER: But you do not do that, specifically, for the loading computer, you are only comparing the output of the loading computer to the trim and stability book, is that correct?

RESPONDENT: It depends on what type of instrument it is.

MR. STETTLER: All right.

RESPONDENT: Some of them do more than others, so we --

MR. STETTLER: Okay.

RESPONDENT: -- if we have to run additional calculations, they're done --

MR. STETTLER: Okay.

RESPONDENT: -- we check them independently.

MR. STETTLER: Okay, could you give me an example of what other --

RESPONDENT: For a tank ship that --

MR. STETTLER: Okay.

RESPONDENT: -- has a Type 3 program, which, basically, because of the deterministic requirements in a damage, it's very dependent upon how much a tank is loaded. Basically, your runoff will affect your results.

So it's very difficult to have an allowable KG curve or minimum GM curve that isn't overly conservative in the T&S booklet. So the Master has the capability of pushing a button and the stability instrument will run through all the possible damage cases on its own and spit out the results that say this condition's acceptable.

In a case like that, we would do an independent check with GHS to make sure that that, you know, we'd run a condition in the stability instrument, run the same condition in GHS, to make sure the results are the same, to confirm the results.

MR. STETTLER: So if I could follow-up with just the -- so you, when you created General Hydrostatics model to do that comparison, what do you

base that General Hydrostatics model off of, what's the baseline for that, development of that model?

RESPONDENT: We take the lines plan, we'll digitize it, compare it, you know, adjust it, based upon the approved drawing, the approved drawings --

MR. STETTLER: Okay.

RESPONDENT: -- and dimensions and run hydrostatics from that and verify the hydrostatics.

MR. STETTLER: Okay, and for the damage criteria there is, what's the other reference that you used (inaudible).

RESPONDENT: Well, we then start looking at the structural drawings and the general arrangement to make sure we get the proper arrangement in the holds.

MR. STETTLER: Okay.

RESPONDENT: In the tanks.

MR. STETTLER: So general arrangement drawing, primarily, general arrangement drawing and lines drawing that, correct?

RESPONDENT: Capacity --

MR. STETTLER: For, for hydrostatic?

RESPONDENT: -- tank capacity plans, all, general structural drawings.

MR. STETTLER: Which are built, which are based on the general arrangement drawing and the lines

drawing, correct, the tank capacities would be calculated, based on the general arrangements --

RESPONDENT: Well, we'd look at the structural drawings, too, to verify --

MR. STETTLER: Okay.

RESPONDENT: -- where, exactly, because the general arrangement's, typically, drawn almost to scale, I wouldn't say it's an exact to scale drawing, --

MR. STETTLER: Okay.

RESPONDENT: -- so we'll verify dimensions using the structural drawings to make sure --

MR. STETTLER: Okay.

RESPONDENT: -- we have the bulkheads in the right places.

MR. STETTLER: Okay. So good. Thank you. And, to that regard, are there any requirements for validation of as-built conditions of the vessel of the general arrangement and the lines drawing, which are used for the bases for these stability calculations?

RESPONDENT: Are you asking, if somebody goes out and checks the lines --

MR. STETTLER: Yes (inaudible) yes --

RESPONDENT: -- planned against the whole self?

MR. STETTLER: Well, not so much the lines planned, general arrangement, specifically, is there any, during a vessel's life, is there, does ABS require, or do they participate in any validation of the general arrangement drawing?

RESPONDENT: That would be a survey issue. I know they have the availability of the plan when they go onboard. I don't know to the extent that they would go through and look at every detail on the plan, you would have to ask --

MR. STETTLER: Okay.

RESPONDENT: -- somebody from our survey department.

MR. STETTLER: But, as far as you know, when you're utilizing a general arrangement drawing, it has not been ABS' -- general arrangement drawings do not get approved by ABS, is that correct?

RESPONDENT: At the time we did the original review that was correct.

MR. STETTLER: Okay. Are general arrangement drawings, are some of them approved by ABS?

RESPONDENT: Some of them are checked. We look at the, not specifically all the details, but just the arrangements in general.

MR. STETTLER: Okay.

RESPONDENT: But to make sure for different cargo compatibility, the different arrangements of where things are in relation to other --

MR. STETTLER: Okay.

RESPONDENT: -- pieces of equipment.

MR. STETTLER: But not approved, so the term approved, which you've used on other items, like the trim and stability book, so the general arrangements are not approved documents?

RESPONDENT: The stability department does not approve the general arrangement plan.

MR. STETTLER: Is there a part of ABS that does?

RESPONDENT: I believe, the structures department looks at the general arrangement plan and it might be something you could check with (inaudible) this afternoon.

MR. STETTLER: Okay. Thank you. And then -- okay. Thank you. That's it for me. Thanks.

INVESTIGATOR STOLZENBERG: Mike, on the line, or Lou?

INVESTIGATOR KUCHARSKI: Yes, I just have a quick question. Mr. Gruber, your wealth of knowledge here, thank you, thank you, for taking the time. Can you tell me off of, if you can, the Intact Stability

Code, the requirements that are currently there, was the El Faro grandfathered for any of these requirements, or pretty much, you know, did she have to keep up with that?

RESPONDENT: The Intact Stability Code, are you referring to the IMO Intact Stability Code from 2008?

INVESTIGATOR KUCHARSKI: Yes.

RESPONDENT: Okay. The Coast Guard has their intact and damage stability requirements in the Code of Federal Regulations in Sub-chapter S, and that's what's been applicable throughout history. They have, over the last two decades, permitted the use of the IMO Intact Stability Code, as an equivalence to that, but not required its implementation.

And the, a lot of the IS Code is, there's only a portion of it that's actually mandatory, a good bulk of it is, actually, just recommendations. So the, the IS Code would require the weather criteria, IMO weather criteria, severe wind and roll criteria, and the IM writing energy criteria.

The Coast Guard, under 46 CFR sub-chapter S, only requires the writing energy criteria for vessels under 100 meters in length, so that would preclude the El Faro from having to meet that criteria. That

leaves, as far as intact stability, the weather criteria, wind heel criteria in 46 CFR 170.170.

INVESTIGATOR KUCHARSKI: Okay. Thank you. I know you had referenced the Intact Stability Code, earlier, so outside of those you just (inaudible) off, those are the ones that are, pretty much, applicable, according to your knowledge, I'm not trying to pin you down, exactly, but what you're saying, in essence, is just Code of the CFR, as opposed to the Intact Stability Code?

RESPONDENT: Yes.

INVESTIGATOR KUCHARSKI: Okay. Thank you.

INVESTIGATOR STOLZENBERG: Okay, this is Eric Stolzenberg. We've participated in earlier interviews with the Deck Operations Group where, I think, we'd all agree, and if I'm putting words in someone's mouth, here at the table, please let me know.

I think we agree that, it indicated that the officers, the deck officers on the TOTE vessels relied, primarily, on the Cargo Max stability instrument, instead of the T&S book. My question is, to you, Mr. Gruber, is, should any rules be changed to address this fact, we learned aboard the ships? And this is an opinion question.

MR. WHITE: The fact that the officers are

relying on them?

INVESTIGATOR STOLZENBERG: The fact that the officers are relying on the stability instrument more than the T&S booklet, as just a what's happening on the deck plates, is, is, are there regulators, or the classification site is behind, or is the approval of the book, excuse me, approval of the stability instrument enough on its own?

RESPONDENT: I think that the stability instrument provides a quicker result for the Master to get an answer. And it also reduces the possibility of errors in transcribing numbers and doing the hand calculations in the stability booklet.

In that regard, I think, having the stability instrument onboard is a good thing. It does allow the Master to evaluate different loading conditions and changes to his loading, their loading condition, in a faster manner and get better results, or get results quicker.

I don't think their, the requirements should change eliminating a written stability booklet, I think we should always have a backup onboard, in case something happens to the booklet, to the onboard program.

INVESTIGATOR STOLZENBERG: Okay. I

appreciate that. I just, with your experience and, and what we've learned here, I --

RESPONDENT: Not --

INVESTIGATOR STOLZENBERG: -- appreciate your opinion.

RESPONDENT: Further, the mates onboard the vessel did know where the stability booklet was and did make reference to them several times, during interviews, so I think most of the time it was the people onshore using the program that were not aware of the trim and stability booklet, they were not aware of the approval of the program, or the requirements to have it checked, or anything along those lines. And that's where I think that the regulations should be changed. We should not be just checking the onboard program, we should be checking any program that's being used by somebody to load the vessel. That should be treated the same as the onboard program.

INVESTIGATOR STOLZENBERG: Well that, in fact, this is Eric Stolzenberg, you just answered my next question is, which is that, and I'll state that we, also, had interviews with shoreside personnel who loaded the vessels at TOTE and, again, if I'm putting words in my colleagues' mouths here, indications where they used Cargo Max, primarily, and not the stability,

trim and stability booklet, at all, and so my question I was going to ask was, did ABS approve the loading software that was used ashore in Jacksonville?

RESPONDENT: I don't know. I believe the version that was onshore was an updated version, as was the copy on the ship, to the one that was approved. So I don't, technically, neither version was approved.

We learned that at -- the, Herbert, when they update a program, based upon the internals and the way the program reacts with different operating systems, they don't necessarily submit that for approval.

We have an issue with that, because our approval, specifically, notes a version number for the program. So the onboard, once they do that, the onboard program is not approved anymore.

INVESTIGATOR STOLZENBERG: So to interject, if I understand it, correctly, the ABS letter approving a version of the software was for a different version then was found aboard the vessel and ashore, loading the vessel in Jacksonville?

RESPONDENT: Yes. So the, even if it was the version that was approved, our surveyors didn't do the annual checks. We didn't check the installation onshore and we didn't do the annual checks against the

approved check conditions, each year, so --

INVESTIGATOR STOLZENBERG: And when you say that your surveyors didn't, you mean specifically to the onshore version of the program?

RESPONDENT: Correct. You asked me, specifically, about the onshore, so I'm --

INVESTIGATOR STOLZENBERG: Correct. I just --

RESPONDENT: -- I'm referring to that.

INVESTIGATOR STOLZENBERG: -- want to make clear.

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: Okay. And if, if I understand you, correctly, your opinion is that, class society, if the program is used in this matter, class society should also have a surveyor verify and check and approved the loading program that is being used ashore?

RESPONDENT: Yes.

MR. O'MEARA: This is Dennis. Just to, just to clarify, in my mind, when we're talking about the shore, the program that's being used ashore, are we talking about a version of Cargo Max that's being used ashore, or are we talking about that Spinnaker Program that was brought up an earlier interview?

RESPONDENT: The Spinnaker, I believe, was a more of a strength, stack weights and what not and there was no requirement for a loading instrument. I'm specifically referring to the Cargo Max Program that was being used onshore.

MR. O'MEARA: Okay. And --

MR. O'DONNELL: This is Louie O'Donnell, in Houston. Tom, a couple of questions for verification. Would it be the scope of class to verify that, between the shore and the vessel that they're both using the same version of Cargo Max?

RESPONDENT: Currently, the class requirements that we have and the, there are Coast Guard guidelines for review of these documents, as well as the IMO Intact Stability Code, all refers to the onboard program.

MR. O'DONNELL: Okay, so it's not within the scope of class for us to verify that they're using the same approved software shoreside?

RESPONDENT: Correct. It's on --

MR. O'DONNELL: Okay.

RESPONDENT: That was the issue, I think, needs to be changed is, we should be looking at programs used for the loading of the vessel, regardless of being onshore or onboard.

In this specific case, the vessel was, basically, the condition was set onshore and the final condition wasn't sent to the Mate, until less than an hour before the vessel was ready to leave.

And it's just very limited time for the Mate to then go up, check the loading condition on their own and implement any changes that they would see necessary, before the vessel sailed. So.

MR. O'DONNELL: And one further question to clarify something that Mr. Stolzenberg asked earlier. Lou O'Donnell, again, here. Would it be the responsibility of the owner, or the owner's representative, if the version of the Cargo Max software is updated, to notify ABS to allow ABS the opportunity to review, to review the changes and see if there is any additional approvals, or anything that needed to be done, and also, for the surveyor to go back onboard and do a verification of the approved conditions to the software onboard the vessel?

RESPONDENT: Yes, it's up to the owner to advise ABS that there's a new program, or new version of the program, have it reviewed and then, it would have to go through the same process of being installed by the, you know, in the presence of the surveyor and checked.

MR. O'DONNELL: Okay. Thank you. No further questions.

RESPONDENT: Just to support what I was telling you about the approval, here's the ABS approval letter and this is in the stability folder, 8 February 2008, and it refers to the Cargo Max for Windows Version 1.2.1.0162 with a specific date.

And then that's, that's what's actually noted on the load line certificate, as the approved document. So that could, that could be a port safe control issue, if somebody decided to go onboard and verify what the program was versus what the approval was.

MR. O'MEARA: Okay, and so -- this is Dennis. So that I understand, you're saying that the version of Cargo Max that was onboard the vessel was not that version?

RESPONDENT: Correct.

MR. O'MEARA: It was a newer version, or an older version?

RESPONDENT: Newer version.

MR. O'MEARA: And the version that was being used ashore was also not that version?

RESPONDENT: It was the same as onboard.

MR. O'MEARA: It was the same as onboard,

but both were newer versions that didn't fall under the, under that approval letter?

RESPONDENT: Correct.

MR. O'MEARA: And then, just one more question on, on, just on process. Getting back to the comment about the fact that the trim and stability book has precedence over the stability instrument that's being used, you know, the notation says it has precedence.

But, in practice, it sounded like you were saying that the trim and stability book is a, in practice, it's considered a backup, in case the stability instrument is, either, found to be flawed, or there's a computer or electronic problem, or the software's corrupted in some way and it's identified as such.

Is there an expectation that the Master, or the Chief Mate, the crew, would use the stability instrument and then, at each sailing, compare, you know, run calculations on the trim and stability book and make some kind of comparison and use the trim and stability book, always, because it has precedence, or, in practice, is it considered to really be a backup versus the stability instrument that's in use?

RESPONDENT: The printed booklet is the main

approved document and the program is a supplement to that, to give the Master greater flexibility than would be allowed in the trim and stability booklet, especially, in tankers where I mentioned the damage stability requirements of, are dependent upon the actual loading condition.

So it is fully expected that the programs will allow the Master greater flexibility in loading, right, otherwise, we wouldn't use them, or you wouldn't use them. It is not expected that the Master would compare the results of the program to the trim and stability booklet. That's what we would do, for class and on behalf of the Coast Guard, to verify that the program is acceptable for use.

MR. O'MEARA: Okay.

INVESTIGATOR STOLZENBERG: Mike, on the phone?

INVESTIGATOR KUCHARSKI: Yes, thank you. Mr. Gruber, so I'm understanding, you know, it's the instrument that's supplemental to the trim and stability booklet. The, practically speaking, the load line requirements and the stability requirements have to be met before the ship puts to sea, before it gets to the sea buoy, is that --

RESPONDENT: Correct.

INVESTIGATOR KUCHARSKI: -- a fair assessment, yes?

RESPONDENT: Yes.

INVESTIGATOR KUCHARSKI: So in your opinion, you know, seeing that it's supplemental to the trim and stability book, do you think that, maybe, the recommendation would be to have them on an equal weight, if it's already, if the instrument is approved?

RESPONDENT: I don't think they're, they're not on a different -- I mean, there has to be one primary document and that's the written document. As a supplement, it doesn't mean it carries less weight, because we're approving it to, for the Master to use it to calculate specific conditions.

In this case, the weather criteria is calculated by the Cargo Max Program, for the El Faro, to provide results that the trim and stability booklet would not provide. So it is on an equal basis, but there has to be a primary.

INVESTIGATOR KUCHARSKI: Okay. Great. Clear. Thank you.

MR. STETTLER: Mike, could I just follow-up with that, real quick? Jeff Stettler here. So just to summarize, so I know there had been people who think they ought to have the trim and stability book right

there, so I'm assuming, based on your last statement that you don't see anything wrong, you know, in your, and with your experience, with the crew depending on the, using, you know, depending the loading instrument, for their daily operations?

RESPONDENT: Correct.

MR. STETTLER: And having the trim and stability book accessible, but, you know, even if it's down in the Chief Mate stateroom, that should be sufficient, as long as it's accessible?

RESPONDENT: As long as it's accessible. I think, in today's day and age, with the technology the way it's going, using a product like this is not a problem.

MR. STETTLER: So it's not unreasonable for the mates to be depending on Cargo Max, in this case, put the loading instrument, in general?

RESPONDENT: So long as they're familiar with the capabilities of trim and stability booklet, if needed.

MR. STETTLER: Thank you.

INVESTIGATOR STOLZENBERG: Mike, any other questions?

INVESTIGATOR KUCHARSKI: No, got it covered. Thank you.

INVESTIGATOR STOLZENBERG: Okay. This is Eric Stolzenberg.

MR. STETTLER: Lou. Lou.

INVESTIGATOR STOLZENBERG: Oh, excuse me, Lou.

MR. O'DONNELL: No further questions, thank you.

INVESTIGATOR STOLZENBERG: Apologies, Lou. Eric Stolzenberg. I've also heard the term, and why we've been doing this investigation, loading manual, is a loading manual different from the stability instrument?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: And just a brief, did the El Faro have an ABS-approved loading manual?

RESPONDENT: A loading manual is a written document that the Master uses to evaluate the longitudinal strength and the bending moments of the sheer forces of the vessel. That was not required for the El Faro when it was built, so the vessel did not have a loading manual.

INVESTIGATOR STOLZENBERG: And when you say built, do you mean 1974 or '75, or do you mean the conversion, the large conversions in '93 and '05?

RESPONDENT: To my understanding, it was not

required when it was built and that did not change with the conversion. But that would be a, more of a question for Suresh (phonetic) when you discuss the structural side of things.

INVESTIGATOR STOLZENBERG: Okay. I'll go around the table, anything on the loading manual, regarding stability?

MR. O'MEARA: No.

MR. STETTLER: Not specifically on the loading manual, but I have an alibi, at some point, when you, you have time.

MR. O'MEARA: Oh, let me, let me just ask one question then.

MR. STETTLER: Sure.

MR. O'MEARA: Getting back to that Spinnaker issue, how do I, is there, is the loading manual and that Spinnaker software somehow are they related in a way that's analogist to the trim and stability book and Cargo Max?

RESPONDENT: I, as I understood, the Spinnaker Program was, basically, a spreadsheet that they were using to figure out what, organize what container and the weight that was going into each slot.

MR. O'MEARA: Right.

RESPONDENT: And calculate the stack weight.

So I, I don't believe, I mean, that was not, there may have, that may have been taken, as an input to go into the loading manual, but as far as being part of the loading manual, I don't believe that that would be part of the loading manual, itself.

MR. O'MEARA: Okay.

INVESTIGATOR STOLZENBERG: Mike --

RESPONDENT: Now it could feed into the loading instrument, but the loading instrument was not required the same as the loading manual.

INVESTIGATOR STOLZENBERG: This is Eric Stolzenberg. Since we brought up the term loading instrument, what's the difference between a loading instrument and a loading manual?

RESPONDENT: A loading instrument does the same as a loading manual, but does it electronically, similar to a stability manual and a stability instrument.

INVESTIGATOR STOLZENBERG: Thank you.

MR. STETTLER: Jeff Stettler. Would that be approved, also, in a similar way, but by the Structures Group at ABS?

RESPONDENT: When required to be, yes.

MR. STETTLER: Okay.

INVESTIGATOR STOLZENBERG: Mike, on the

phone?

INVESTIGATOR KUCHARSKI: No questions.

INVESTIGATOR STOLZENBERG: Lou?

MR. O'DONNELL: No further questions.

INVESTIGATOR STOLZENBERG: Okay. Do you --

MR. STETTLER: Alibi? I have a question, and I stopped. I was getting ready to ask it and I stopped, but it seemed like a dumb question, at the time, but I think, maybe, it's not, and it referred to a lines drawing.

And, basically, our lines drawings, you know, a vessel is, a lines drawing is a preliminary tool for designing the whole form of a vessel. Is there anything, is there any validation of that lines drawing to be as-built condition of a vessel, as far as ABS is concerned?

RESPONDENT: I don't believe our surveyor takes the lines plan and goes out to verify that the, the curves --

MR. STETTLER: Okay.

RESPONDENT: -- and everything are built to that.

MR. STETTLER: Okay. Thank you.

INVESTIGATOR STOLZENBERG: All right. I'm going to bring up another topic that you may or may not

know about, Tom. You know, I've read in class societies that there's machinery heel and trim requirements the vessel has to meet, are you familiar with these?

RESPONDENT: I am aware that they exist.

INVESTIGATOR STOLZENBERG: Do you know what degrees they are for ABS class rules?

RESPONDENT: No.

INVESTIGATOR STOLZENBERG: Okay. I had, and this is Eric Stolzenberg. I had numbers I've seen are 22.5 degrees heel and 7.5 degrees pitch, do those sound about right?

RESPONDENT: I, I would not be able to answer that question.

INVESTIGATOR STOLZENBERG: Okay. Thank you. I just, what I was trying to do is understand those machinery rules, at some point, when we talk about how much a vessel heels and what that may have to do with why an engine fails, or not, in the case of the El Faro. I will move on from that topic. Does ABS surveyors, or engineering, verify physical draft marks on a vessel, and if so how?

RESPONDENT: When we approve the drawings, we do look at the drawings when draft marks are installed and then they're sent to the surveyor to

verify. And, typically, they're verified in dry dock. The specific details would have to be answered by the surveyor, itself, but I've never done it, myself.

INVESTIGATOR STOLZENBERG: Okay. Any other questions on draft marks, I'll start with Dennis?

MR. O'MEARA: No.

INVESTIGATOR STOLZENBERG: Jeff?

MR. STETTLER: No.

INVESTIGATOR STOLZENBERG: Mike?

INVESTIGATOR KUCHARSKI: No, thank you.

INVESTIGATOR STOLZENBERG: Lou?

MR. O'DONNELL: No further questions.

INVESTIGATOR STOLZENBERG: Okay. Bear with me a moment. I want to ask you, Tom, about hogging a deflection. If a vessel's loaded to its mid ship's load line mark and it's hogging and makes the actual displacement excess of the stated load line displacement, does this fact indicate the vessel is overloaded beyond its scantlings, or beyond the maximum displacement using the structural review?

RESPONDENT: The maximum draft is set by the load line, the Plimsoll mark, if that is submerged, then the vessel is exceeding its permissible draft. Now, the Load Line Convention does permit the vessel to submerge the marks, if it's in a fresh water port with

a calculation to make sure that this, when it gets to sea, you know, or the buoy, that the mark is not submerged. But once you exceeded, regardless of why, you've exceeded the allowable draft of the vessel.

INVESTIGATOR STOLZENBERG: So to be clear, whether the vessel's hogging, or sagging, if the Plimsoll's submerged in salt water, it's exceeded, from a statutory standpoint, it's exceeded the --

RESPONDENT: That's correct.

INVESTIGATOR STOLZENBERG: -- the load line draft? What's the technical effect of this, if it, if, let's say in the case of the El Faro, potentially, was due to a hogging, what's the technical effect?

(No response)

INVESTIGATOR STOLZENBERG: What I mean is, what negative effect does it have on the vessel, even if the displacement is, technically, the same, but we've submerged the Plimsoll, due to hogging?

RESPONDENT: You're, at that point, you're bringing the deck closer to the water, so you're bringing any potential openings closer to the water.

INVESTIGATOR STOLZENBERG: Okay.

MR. STETTLER: Oh boy. I'll pass, for right now.

INVESTIGATOR STOLZENBERG: Okay.

MR. STETTLER: I had one, but I just forgot what it was.

MR. O'MEARA: Well, I'll follow-up --

MR. STETTLER: Oh well, actually, I do remember. So the definition of load line has to do with the mid ship draft marks, the Plimsoll --

RESPONDENT: Correct.

MR. STETTLER: -- correct?

RESPONDENT: Yes.

MR. STETTLER: I just want to make sure that it's clear then, in your view, that displacement of the vessel has nothing to do explicitly with the load line, other than through that definition of that Plimsoll all mark, correct?

So in other words, as long as that Plimsoll mark is, so this is going back to the hogging condition, as long as the Plimsoll mark is not submerged, even though, in a hogging condition the bow and the stern would actually be a little deeper in the water, by some number of inches, and therefore, the displacement, at the Plimsoll mark, may be, the actual displacement of the vessel may actually be in excess of the load line displacement, or the equivalent load line displacement.

And I think this gets to Eric's question of,

what are the implications of that? Because, as far you're concerned, your understanding of the requirements that the displacement is not, has no direct correlation with load line, is that correct?

RESPONDENT: The Load Line Convention does not talk to hogging or sagging conditions. Trim conditions can also change the displacement. It'll also put the, you know, if the Plimsoll mark is at the water line, the bow, with a head trim, you're going to submerge the bow more than is done.

And that's, that's acceptable. There is no prohibition against that. The topic of displacement was just discussed at IMO last week and it was agreed to not to limit it to, you know, the official displacement would be at even keel, but there would be no problem, if in a trimmed condition, you exceeded that displacement. So --

MR. STETTLER: Are there any --

RESPONDENT: -- you can't get more current than that.

MR. STETTLER: -- (inaudible), and perhaps this is a question for the Structures Group, but the displacement, or the load line that is used for structural calculations, so stability calculations, if still that, everything, what you just stated, is

everything is assuming and even zero, zero deflection, right, no hog, no sag, even keel, correct, for the analyses that are done?

RESPONDENT: It depends on the analysis that's done. Some Naval architects will submit things for different trims, so --

MR. STETTLER: Is that required?

RESPONDENT: No. Well, it, based, under SOLAS there are different requirements, based on the new, you know, based on the updated probabilistic --

MR. STETTLER: Okay.

RESPONDENT: -- requirements, but at that time, no.

MR. STETTLER: Okay. Thank you.

MR. O'MEARA: No.

INVESTIGATOR STOLZENBERG: Mike, any questions?

INVESTIGATOR KUCHARSKI: Yes, I guess, just a general one going back to the hog and sag conditions. So if the vessel exceeded her displacement, it would still be okay, she would be in compliance, if she were in severe hog and the, the Plimsoll was not below water?

RESPONDENT: From the statutory standpoint, yes.

INVESTIGATOR KUCHARSKI: Okay. Thank you.

(Off microphone discussion)

INVESTIGATOR STOLZENBERG: Lou, any questions?

MR. O'DONNELL: Yes. Lou O'Donnell with ABS here in Houston. Just one clarification, coming back to inclinations, you asked about, Eric. There's various, various inclination limits, depending on the type of equipment and what the equipment is, whether it's emergency equipment, main propulsion, so and that is covered in 411 Table 7 of the Steel Vessel Rules. It would be dependent on what the equipment is and what its service is.

INVESTIGATOR STOLZENBERG: Okay. Thank you, Mike. And that's in regard to my question about the machinery and heel and trim requirements?

MR. O'DONNELL: Yes, the design angles for inclination that the machinery and equipment would have to meet, yes, sir.

INVESTIGATOR STOLZENBERG: Thank you. Okay, I'll move on to an additional question. This is unrelated. I was reading a Marine log article, November 2016, it stated, I quote, "POSSE is a naval version of the HECSALV Naval Architect software package from Herbert/ABS Software Solutions, LLC."

It further states, "Herbert/ABS is a joint venture between Herbert Engineering Corporation and ABS and that," it quotes "sets the standard for leading edge stability, load management, and emergency response software solutions for the marine and offshore industry", including, "Cargo Max, shipboard trim and stability loading." My question is, do you know what the relationship is between ABS and Herbert Engineering Corporation, regarding the HECSALV and the POSSE software?

RESPONDENT: We have entered into a joint partnership with Herbert, as an investor, in a 50/50 position in that joint venture. We are not involved in the development, or the sales, or none of our people are stationed with them, it's an investment for ABS.

INVESTIGATOR STOLZENBERG: And I understand ABS to have a not-for-profit class side and a for-profit consulting side?

RESPONDENT: Correct.

INVESTIGATOR STOLZENBERG: Which portion of ABS is involved with the Herbert/ABS Software Solutions?

RESPONDENT: The ABS Bureau is the not-for-profit side. ABS group of companies is a for-profit side and that is part of the group of

companies.

INVESTIGATOR STOLZENBERG: Okay. So how does ABS Bureau, the class side, ensure that it remains separate from the Software Solutions profit side?

MR. WHITE: You know, and to --

INVESTIGATOR STOLZENBERG: To your knowledge?

RESPONDENT: Well -- Oh.

MR. WHITE: You know, I only put a stipulation on the record. I mean, obviously, Mr. Gruber's respond from his experience at ABS, but that's not a, as far as a corporate set up, with that understanding, I don't think he's able to speak to that.

INVESTIGATOR STOLZENBERG: Understood. Could I ask a, let me, could I ask a question of Mr. Gruber, then?

MR. WHITE: Certainly.

INVESTIGATOR STOLZENBERG: From his experience in approving stability drawings that use Cargo Max and Solutions from Herbert/ABS Software Solutions, can I ask a question regarding how he approves those relative to other corporation software solutions?

MR. WHITE: Sure.

RESPONDENT: Okay. As a member of the group of companies, they're completely separate from the Bureau, it's a separate entity, just like every other Naval architecture company, so they're treated no different than any other Naval architect that comes, that submits something, you know, to us.

INVESTIGATOR STOLZENBERG: So the process isn't any faster, or less stringent, than --

RESPONDENT: No.

INVESTIGATOR STOLZENBERG: -- a different solution?

RESPONDENT: We don't have people in their offices, in the development, or the sales. We don't treat them any different than any other Naval architect shipyard owner that comes through the door.

INVESTIGATOR STOLZENBERG: Okay. I will pass that around the table. To, Mike, on the phone?

INVESTIGATOR KUCHARSKI: No, no questions. Thank you.

INVESTIGATOR STOLZENBERG: And to Lou.

MR. O'DONNELL: No, no further questions.

INVESTIGATOR STOLZENBERG: Okay. For myself, this is Eric Stolzenberg, that concludes my list of questions, so I'll go around the table, first, to Dennis, and bring up any topics I didn't bring up --

MR. O'MEARA: No, we covered it, pretty well, in fact, I didn't have any, anything else beyond what you addressed.

INVESTIGATOR STOLZENBERG: -- (inaudible) discuss.

MR. STETTLER: I have nothing else.

INVESTIGATOR STOLZENBERG: Mike, on the phone?

INVESTIGATOR KUCHARSKI: No. That's it. Thank you.

INVESTIGATOR STOLZENBERG: Lou?

MR. O'DONNELL: No further questions here from Houston, no.

INVESTIGATOR STOLZENBERG: Okay. Well then I'll wrap it up with my typical question, is there anything, Tom, that we didn't ask you that we should've asked you that could be relevant to the casualty of the El Faro, the rules and regulations that are, or aren't, present that might help, or another person we might interview, who could provide pertinent information?

RESPONDENT: I think there's, the issue of the authority that we reviewed the stability under, on behalf of the Coast Guard, is of importance in this situation. The initial review was done under U.S. Coast Guard NVIC 384-1. And the second review was done

under NVIC 397 and the processes were very different between the two.

Under 384, we performed the independent analysis, reviewed everything, and then sent everything to the Coast Guard Marine Safety Center, with a recommendation for the issuance of a stability letter.

At that point, they do their own check, to satisfy themselves that everything was done right, and then will issue the stability letter to the vessel. In this case, this was the first probabilistic damage stability check of a U.S. flagged vessel.

The Coast Guard issued a temporary stability letter to do a complete independent check, which they completed and issued a stability letter, I think, in November of 1993. So there wasn't just the Naval architect and ABS doing a review, there was a third check to verify that, what was done was done correctly.

NVIC 397 was different. At that point, we did the review and issued the approval and it was sent directly to the vessel for operation. We didn't have to wait for the Coast Guard to take any action.

But, through the oversight process, it was up to the Coast Guard, at that point, for each step along the way to decide, whether or not they wanted to do a review, an oversight review of that project.

And I don't know, at this point, if they, if they did do a, if that was chosen for a review and checked, without issue, we weren't advised. Okay? We, typically, we'd only be advised, if there was a problem with the review and they'd come back to us for more information and have us redo the, redo the approval. And that wasn't the case in this. So I just think that the two different processes were, were important to get down on the record.

INVESTIGATOR STOLZENBERG: Thank you. And it, actually, brings up a paragraph, and I apologize for backtracking, that I didn't cover, which was an alternate compliance program. And, I think, you've just referenced something there is, I wanted to ask you, when, to your knowledge, you knew it entered the Alternate Compliance Program, the ACP Program?

RESPONDENT: This vessel would have, I believe, entered the ACP Program in 2010.

INVESTIGATOR STOLZENBERG: And so both stability reviews the, in '93, done the 384, and in 2005, done the 397, both of those were done before the vessel was in the Alternate Compliance Program?

RESPONDENT: Correct.

INVESTIGATOR STOLZENBERG: If it, if the vessel hadn't been in the Alternate Compliance Program,

would it have changed any of your processes in 2005/2006, for the 397 review?

RESPONDENT: The ACP Program would then allow ABS to apply our class rules and the IMO requirements to the vessel. Our class rules allow the use of a national stability requirement, in lieu of the criteria that's in the class rules, as an equivalent.

So conceivably, would could use the same requirements that were used in 1997, in 1993 and 1990, sorry, in 2006, 2007, 2008, under ACP, so it wouldn't have changed.

INVESTIGATOR STOLZENBERG: Okay. Since we did breach the subject, are there any questions here at the table?

MR. STETTLER: No.

MR. O'MEARA: No.

INVESTIGATOR STOLZENBERG: Lou?

MR. O'DONNELL: No questions.

INVESTIGATOR STOLZENBERG: Mike, on the phone?

INVESTIGATOR KUCHARSKI: No questions, thanks.

RESPONDENT: I do have one other issue to bring up.

INVESTIGATOR STOLZENBERG: Feel free.

RESPONDENT: The arrangement of the ventilators, the intake and the exhaust ventilators, on the El Faro, as installed, met the load line requirements, at the time, and if that, they continued to meet the requirements, as of right now, you know, in the 2005 addition of the Load Line Convention. So if that same arrangement was proposed today, we would accept it, under the current regulations.

INVESTIGATOR STOLZENBERG: So to be clear, when you say, as-built in '74, they would have met the rules, the class rules, at the time Applicable Steel Class Rules at the time --

RESPONDENT: The load line requirements.

INVESTIGATOR STOLZENBERG: Excuse me, the load line requirements, and that you reviewed the, I assume you've then done a review yourself, of today's requirements for load line and looked at those ventilators and come to the conclusion that they would also be acceptable today?

RESPONDENT: Yes.

INVESTIGATOR STOLZENBERG: And, I guess, I'd have to ask you, then, in your opinion, is there, is there an issue with those ventilation, is there a safety issue with those ventilation openings, from a, from a practical standpoint?

RESPONDENT: To meet the statutory requirements, they would continue to meet the requirements today. Now, there could be issues, if the sea states and wind conditions exceeded what was considered under the statutory requirements.

And in that case, the Master and the crew would need to know to, if they were securing the ship, to include those openings, you know, if there was a situation that required it. They would need to be aware that they have the possibility of allowing water into the hull, just like any other hatch, door, air pipe, and ventilator.

INVESTIGATOR STOLZENBERG: Okay. And, I believe, what we're, what we're referencing is that those ventilation openings, even though they're baffled inside in the, in some of the ventilation drawings that we've seen, is those, through those ventilation openings, are the lowest downflooding points into the holds of the vessels, of the vessel, in particularly, the El Faro?

RESPONDENT: They were considered, as a downflooding, the baffle point were considered as the downflooding points.

INVESTIGATOR STOLZENBERG: Okay. Any other questions along this line?

MR. STETTLER: No.

MR. O'MEARA: No.

INVESTIGATOR STOLZENBERG: Mike, on the phone?

INVESTIGATOR KUCHARSKI: No.

INVESTIGATOR STOLZENBERG: Lou?

MR. O'DONNELL: No further questions.

INVESTIGATOR STOLZENBERG: Okay. Anything else, Mr. Gruber?

(No response)

INVESTIGATOR STOLZENBERG: Well, I definitely appreciate your experience and taking the time to speak with us today and we'll wrap up the interview. The time is 11:54 a.m. Off record.

(Whereupon, the interview in the above-entitled matter was concluded at 11:54 a.m.)

C E R T I F I C A T E

MATTER: El Faro Incident
October 1, 2015
Accident No. DCA16MM001
Interview of Thomas Gruber

DATE: 01-29-16

I hereby certify that the attached transcription of page 1 to 119 inclusive are to the best of my professional ability a true, accurate, and complete record of the above referenced proceedings as contained on the provided audio recording; further that I am neither counsel for, nor related to, nor employed by any of the parties to this action in which this proceeding has taken place; and further that I am not financially nor otherwise interested in the outcome of the action.

- [redacted] -

TABLE OF CORRECTIONS TO TRANSCRIPT OF INTERVIEW FOR

Thomas Gruber

TAKEN ON

29 January 2016

PAGE NUMBER	LINE NUMBER	CURRENT WORDING	CORRECTED WORDING
3	15	Headquarters	Washington DC
6	18	where	when
6	25	do	due to
7	2	work with	work to ensure the consistent application and review of statutory requirements across ABS' technical offices, address technical questions, and work with
7	10	issue	Delete this word
7	25	Services	services
9	8	hatchet	hatches
11	7	tow	two
12	13	donated	delineated
12	14	seals	sills
13	20	sacked	sagged
15	2	uploaded and	Delete these words
16	16	effect	affect
17	5	improved	approved
17	8	TNS	T&S
18	8	base	be based
20	18, 23, 24, 25	Maro	Morro
21	1, 5, 9	Maro	Morro
23	16	2-1	II-1
28	3	of	or
31	17	rung	run
32	3	rung	run
34	13	Marine Technical in '04/'95	Marine Technical Note 04-95
38	6	waste (3x)	weights
38	10/11	submit a	the submitted
46	8	representation	representative
47	17	prehistorical	historical
48	21	extensive	extents of
48	24	guaranty	guarantee
49	11	rigging	raking
54	11	decisontry	decision tree

69	2	empt	nth
74	3	IX	IACS
74	5	booklets, IX URL-5	programs, IACS UR L5
76	9	crane	grain
78	14	we make	Delete these words
82	24	planned	plan
82	25	self	ship
83	2	planned	plan
84	16	(inaudible)	Suresh
85	21	IM writing	IMO righting
85	23	writing	righting
93	10	safe	state
99	10	alibi	?
99	18	analogist	analogous
101	6	Alibi	?
112	25	384-1	3-84 change1
113	1	397	3-97
113	3	384	3-84 change1
113	18	397	3-97
114	20	the 384	to 3-84 change1
114	21	the 397	to 3-97
115	2	397	3-97
115	9	in 1997, 1990	Delete these words
115	10	sorry,	Delete this word

If, to the best of your knowledge, no corrections are needed kindly circle the statement "no corrections needed" and initial in the space provided.

NO CORRECTIONS NEED. _____
Initials

_Thomas M. Gruber_____
Printed Name of Person providing the above information

[redacted]
Signature of Person providing the above information

22 FEBRUARY 2016
Date